UiO : Centre for Entrepreneurship
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The Role of TMT in Norwegian High-Tech Startups

An explorative analysis of top management teams and firm's performance in light of Upper Echelon, Diversity, Performance theories and by utilizing elementary and advance statistical techniques

MSc in Innovation and Entrepreneurship

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ABSTRACT

The purpose of this study is to explore team processes and diversity related factors that affect firm's sustainable performance. The research has been carried out in the context of top management teams (TMT) in Norwegian high-tech Startups. Building on established theoretical basis, cross sectional survey data was collected on multiple facets of leadership & central team processes such as Entrepreneurial Orientation (EO), Strategic Decision Speed and Comprehensiveness, Polychronicity/ Multitasking, Interpersonal & Task-oriented Interactions and other similar factors. In addition, a broad range of diversity related items like age, gender, no. of TMT members, leader's diversity preferences and others have been included in the survey. Through extensive use of both elementary as well as advance statistical techniques like Graphs, Correlation, Multi Regression, Structural Equation Modeling (SEM) the survey data has been analyzed. In the light of testing propositions the research results are then modeled using Regression based Path Analysis and SEM based techniques. There is a substantial room for improvements in the data collection especially for diversity related items, measuring instruments and the analysis techniques.

This research supported that Sociobehavioral Integration (SBI) is a valid and operational construct, which could be utilized as a measure of gauging team's performance. The analysis revealed that entrepreneurial orientation (EO) is positively correlated to both the SBI and performance of a team. Strategic decision making speed and comprehensiveness showed positive relationship with EO. The operationalization of three types of diversities was achieved - disparity, separation, variety. The effects of diversities were not supported significantly in regression analysis as anticipated. The gender (male) had a significantly negative effect on decision-making comprehensiveness, though in a weaker model. Thankfully, this research provided a rich learning experience spanning many areas for the author.

Keywords

Top Management Teams, TMT, Norwegian Startups, Sustainable Competitive Advantage, Upper Echelon, Diversity, Disparity, Separation, Variety, Demographic, Constructs, Survey, Questionnaire, Sociobehavioral Integration, SBI, Interpersonal Interactions, Task-Oriented Interaction, Strategic Decision Speed, Strategic Decision Comprehensiveness, Polychronicity, Multitasking, Entrepreneurial Orientation, Resource Based View, Competitive Dynamics, Social Identity Theory, Tuckman Model, Explorative Approach, Diversity Measurement.

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FOREWORD

A sustained motivation to study leadership has been author's own experience in establishing couple of high-tech Startups as founding member & CEO. These efforts started back in 2006 with a number of short courses on Business Management and Entrepreneurship. This eventually resulted in enrollment to a Master program on Innovation and Entrepreneurship. Another dimension of author's interest in the subject area of teamwork has been almost two decades of consulting experience in the field of Information and Communication Technology (ICT). The experience of working as team member with opportunities to lead teams at various occasions instigated to produce this research. This included working close to client's management team for both public and private sectors organizations. Another motivating aspect for selecting this topic is the paucity of research publically available on Norwegian high-tech startup firms.

The author is confident that this research will contribute to future work and advancing the research particularly for the measurement of team diversity and its rather newly established facets disparity, separation, variety and other standalone categorizations like heterogeneity, demography, gender, surface & deep levels, values, and faultlines etc. The nature of enquiry and short time available to complete this study, demand that the author follow an explorative - descriptive approach with a relativist design to analyze top management teams characteristics and performance in the context of Norwegian high-tech Startups. The proposition testing using standard regression techniques helped explain the results adding an explanatory dimension to this study. Survey design, data collection, use of statistical tools and techniques took roughly 70% of author's time during this research. That included spending days and night learning SPSS, AMOS, Structural Equation Modeling, and Partial Least Square.

This research proved to be a rich learning experience for the author as it covered many important dimensions such as conducting research, survey design and data collection, hand-on experience with statistical & analysis techniques and interpreting data. In a sense, it ignited the motivation and provided tools to do more research on these topics. Above all, it provided a deeper insight in team processes and human diversity through a context that the author is very well familiar with. This will definitely be useful in whatever team related activities the author will engage in, both in his personal and professional capacities.

EXECUTIVE SUMMARY

The purpose of this study is to highlight team processes and diversity related factors that affect firm's performance. Through a well-designed cross-sectional survey data was collected on multiple facets of leadership, team's processes, and items pertaining to sustainable competitive performance. A special focus was given to central team processes like decision making, Polychronicity (multitasking), inter-personal and task-oriented interactions, cohesion, team/ entrepreneurial orientation and other factors. In addition, items that entail surface and deep level diversities have also been included. Though Upper-Echelon Theory provided a framework, however for diversity measures, diverse approaches have been utilized ranging from graphs to more advanced ones like factor analysis, multi regression, and structural equation model (SEM). A revision of strategic management topics has been refreshing and useful especially Tuckman model for team development which seems equally applicable to various kinds of teams whether professional teams like TMT or personal teams level like partnerships, marriages and many more.

This research supported that sociobehavioral integration is a valid and operational construct that could be utilized as a team performance measure. The analysis revealed that construct (team) entrepreneurial orientation is positively correlated to the both the sociobehavioral integration and performance of a team. Decision-making comprehensiveness and speed showed positive relationship with entrepreneurial orientation. The operationalization of three types of diversities was achieved - disparity, separation, variety. The regression analysis has not supported effects of diversities as anticipated. The gender (male) has a significantly negative effect on decision-making comprehensiveness though in a weak model. There is substantial room for improvements in the collection of diversity related data, operationalization, measuring instruments and the analysis techniques.

The author is very grateful to his supervisor for this thesis Dr. Truls Erikson at the Center for Entrepreneurship, University of Oslo for his great motivational support, continuous guidance and for all the fruitful discussions.

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1. INTRODUCTION

The study of top management team characteristics that can have an effect on a high-tech startup's performance is a multi-facet & multi-disciplinary research covering areas like entrepreneurship, leadership, teams, high-technology business, high-growth, personalities, assessment (Carpenter 2004; Hambrick 2007; Bird, Brandt et al. 2009; Carsrud and Brännback 2009; Carpenter 2011); therefore it has been a challenge to handle such a broad topic in a short semester time frame with varying degrees of knowledge.

What influences performance of an organization or a company effectively at a given time is a vast field of study if all relevant factors are taken into consideration (Richard, Devinney et al. 2009). At the macro level an effective analytical model may combine Five Forces (Porter 2008) with PEST analysis (Fleisher and Bensoussan 2007) that in its extended version (Wikipedia 2012) includes Political, Economic, Social, Technological, Environmental, Legal, Ethics, Demographical factors (PESTELED/STEEPLED). Though at the organizational level these or their micro-level substitutes are at work, it has been an established convention to use different terms and theoretical models to analyze the influence on performance from such an intimate level. So within the context of organization, team and individual levels factors spanning strategic, tactical and operational dimensions are better predictive or even indicator of organization's performance or success (Sole and Schiuma 2010).

This paradigm applies very well to the cross sectional study under focus on high-tech startups in Norway. Somehow there is not sufficient research on this particular topic (Jan Inge Jenssen 2006) Although at the macro-level application of STEEPLED factors can be helpful in comparing regional or national differences, however these factors are considered equally applicable for the Norwegian companies in the study. The study mainly focuses on micro level characteristics pertaining to Top Management Team (TMT) including Chief Executive Officer (CEO).

Extensive research in business management and social sciences has established that there is a positive relationship between the role of TMT and performance of a company (Nielsen 2010; Carpenter 2011). Further research have expanded TMT's role in decision making process; behavior and motivation; personal capacity & inclinations; team, network and relationships; way of working, acquisition of knowledge and problem solving. This was mostly done

through multidisciplinary research work from psychology, social, leadership, entrepreneurial and innovation sciences like formation of Upper Echelons Theory.
Recent research has shown relationship between multitasking (polychronicity) in decision making and Performance. The research area pertaining innovation and TMT strategic support system is evolving and have practical impact for startups which are desperately looking for help especially in their early stages.

1.1 Role of leadership

The role of leadership is relevant in almost every aspect of life (James MacGregor Burns 1-336) from the personal arenas to being parent of children or teacher for young or adult students to arenas like business, society, politics, belief systems etc. Whether it is in famous projects like Man on the Moon, making of Hollywood films, in the rise and fall of nations, or in establishing a high-tech company - the role of leaders is commonly understood to be a critical factor for the success or failure of whoever being lead for some agreed goals. These, in one way are pointing out that there exist many different flavors of leadership for different arenas, still modern research suggest this is not necessarily the case. For some time leadership has matured into a profession that can be studied and learned, still personality traits or styles of practicing leadership do exist. (Northouse 2012)

With the rapid, still gradual change in organizational structure in post industrialization world the concept of management teams has become more relevant than a one great leader, still for new startups we are back to basics. In terms of entrepreneurship or new startups leadership role in top management team, has been of some research for finding out special skill set that is required to succeed in their particular areas of work in the context of their special working environment (**Reid** and **Xu** 2009)

The importance of traits or inclinations of TMT and its effect on their respective startup venture can be understood by visualizing a painter who wants to transfer an image from his mind or imagination to a canvas. Most people will agree that the “final result” or how finely the painter is able to do this will largely depend upon the painter’s abilities or skills, preferences, environment or conditions and tools available for the job. One can argue that measuring success or failure in such cases is a subjective matter; still for entrepreneurs and

their respective startups there are established criteria of survival, growth, and financial stability and market valuations.

1.2 Research Questions/ Model

The objective of this study was to explore Top Management Team (TMT) characteristics that will affect the performance of high-tech startups in Norwegian context. Due to limited amount of time to complete this dissertation, a rather simple research questions was conceived:

- Explore team processes and diversity factors that influence significantly the performance of a high-tech startup in the light of relevant theories.

This broad and explorative research question will get more direction after theoretical discussion in chapter 2. In the last section of chapter 3, this research question will be further extended by building relevant propositions.

1.3 Survey

This study is based on a survey that was prepared after months of discussions and team effort. The author has a main role both in the design and data gathering while the analysis process was left to every team member according to their research project focus. The survey targeted a random selection of top management team (TMT) members from Norwegian high-tech firms. They were asked questions pertaining team processes and diversity related characteristics in the context of themselves, their top management team and the firm.

1.4 Composition

After introduction, chapter 2 explains some relevant terms and builds essential theoretical foundation and relevant research including survey as a data gathering technique is presented. Chapter 3, describes data cleaning work and some basic data analysis procedure. This leads to chapter 4 on findings where the analysis work with some interpretations is taken care of. While chapter 5 discusses results, throw some light on areas of improvements and future research directions. In Appendix the original questionnaire, diversity research guidelines by Harrison and Klein, basic descriptive analysis, correlation matrix between factors and items of the survey, regression tables, as well as some data pertaining to structural equation modeling is given as reference.

2 THEORETICAL FOUNDATION AND RELEVANT RESEARCH

What influences performance of an organization or a company effectively at a given time is a vast field of study if all relevant factors are taken into consideration (Richard, Devinney et al. 2009). At the macro level an effective analytical model may combine Five Forces (Porter 2008) with PEST analysis (Fleisher and Bensoussan 2007) that in its extended version (Wikipedia 2012) includes Political, Economic, Social, Technological, Environmental, Legal, Ethics, Demographical factors - PESTELED/STEEPLED. Though at the organizational level these or their micro-level substitutes are at work, it has been an established convention to use different terms and theoretical models to analyze the influence on performance from such an intimate level. So within the context of organization, team and individual levels factors spanning strategic, tactical and operational dimensions are better predictive or even indicator of organization's performance or success (Sole and Schiuma 2010).

This paradigm applies very well to the cross-sectional study under focus on high-tech Startups in Norway. Somehow, there is not sufficient research on this particular topic comparing to enormous amount of research work done and still in progress around the globe. With this as a motivating factor for the study it is safe to mention that the macro-level STEEPLED factors are helpful in comparing regional or national differences, still these factors are considered normally non-dominant for companies in same region and especially those in the startup phase of their existence. Of course in an analysis of niche startups competing in global market these factors will become relevant. The focus of this study therefore is the characteristics that are directly related to Startup firm, their Top Management Team or TMT and Chief Executive Officer or CEO in the context of their local market.

The coming sections will describe important terms and dimensions that are essential in understanding the choice of theoretical background as well as variables and constructs chosen for this study.

2.1 Important Terms and Concepts

2.1.1 High-Tech Companies

High-tech or hi-tech is now more or less commonly used term for certain technology related sectors as well as product groups(Wikipedia 2009). According to (Loschky 2008) the OECD definition includes following nine main sectors in this category:

> Aerospace, Computers and office machines, Electronics and telecommunications, Pharmacy, Scientific instruments, Electrical machinery, Chemistry, Non-electrical machinery and Armaments

Although there is an important distinction between high-tech products and whatever produced by high-tech industries or companies. Still for choosing companies for this study an aggregated approach is utilized. There does exist detailed classification of sectors like US 45 SIC codes (**AeA** 2009) or Norwegian industry codes, still for this study a casual approach was followed rather than screening companies stringently.

2.1.2 Startups & Their Life Cycles

People or companies do create new business or startups for capturing opportunities in the market and capitalizing on unique capabilities they may poses or have access to. To better understand a startup or an entrepreneurship process the framework or models described by the researcher can be used (Nesheim 2000; Anderson, Covin et al. 2009; Carsrud and Brännback 2009; Carpenter 2011). This would mean a Startup might face number of uncertainties and challenges such as lack of financing, difficult and non-clear picture of their market, no direct access to right people etc. In terms of financial stability throughout the life cycle of a new business or Startup the depiction on next page will of help (Wikipedia 2009).

There seems to be huge amount of research on startup / entrepreneurial companies of all kinds as well as that on established companies and those in public sector. Some useful work is carried out as given in a chart in the Appendix, titled as Organizational Life Cycle Phases (Miller and Friesen 1984). However, the need and role for leadership during each life cycle phase Startup pass through seems not that widely been researched. This may be due to research challenges in observing/ recording leadership over a longer period of time – longitudinal studies. To improve this - continuous data gathering, analysis and interpretation through advance statistics techniques can be useful (Esposito Vinzi 2010; Hair 2010).

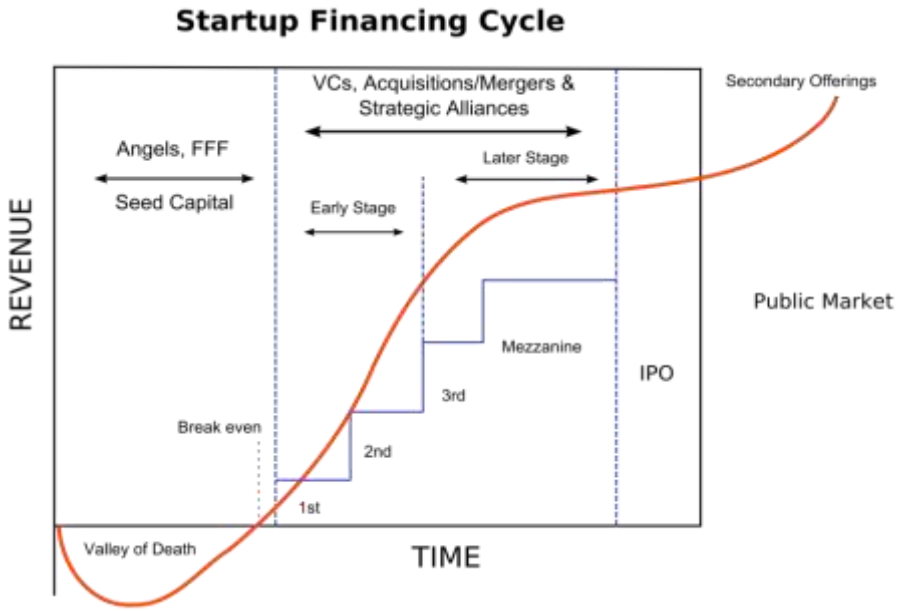

Figure 1 Development Phases & Financing of a Startup

2.1.3 Top Management Teams

The most important asset a new business or startup has is their leadership or top management team. Normally it is a single person or a number of people who constitutes a startup top management team. Tremendous research efforts on leadership have been done, still researchers are looking in to this from different angles.

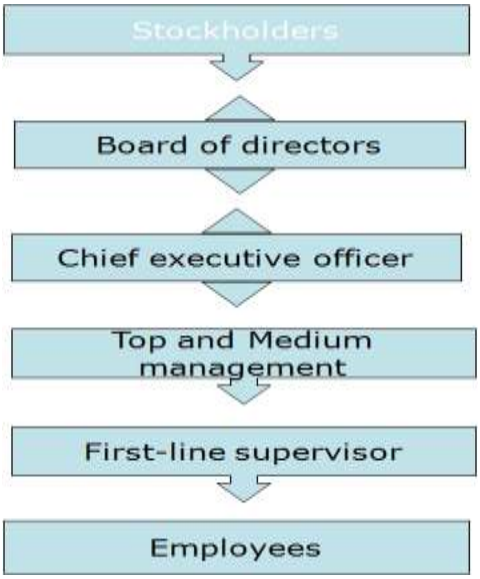

Figure 2 A Typical Organizational Hierarchy

2.1.4 Vision, Objectives, Strategies, Tactics and Operations

To give an idea of what top management team usually have to engage in, let's fresh up what's very basic in strategic management (Olsen 2011) and applies to both large multinational organizations as well as to smaller startups. That is to have some vision/ hope/ dream for the future of their company and then discipline themselves for structured work – hopefully hard and smart to achieve these goals. Luck mostly is the necessary ingredient if they want to make sure good results. Startups are not an exception where on somewhat small and consolidated scales the work on Mission, Vision, Values, Objectives, Strategies, Tactics and Operations which are happening all the time (Schermerhorn 2012). In contrast to the large organizations, in startups the responsibility of making things happen stay more on the shoulders of CEO and small TMT than on a distributed organization and on multiple teams. The depictions below will clarify how these concepts are linked together.

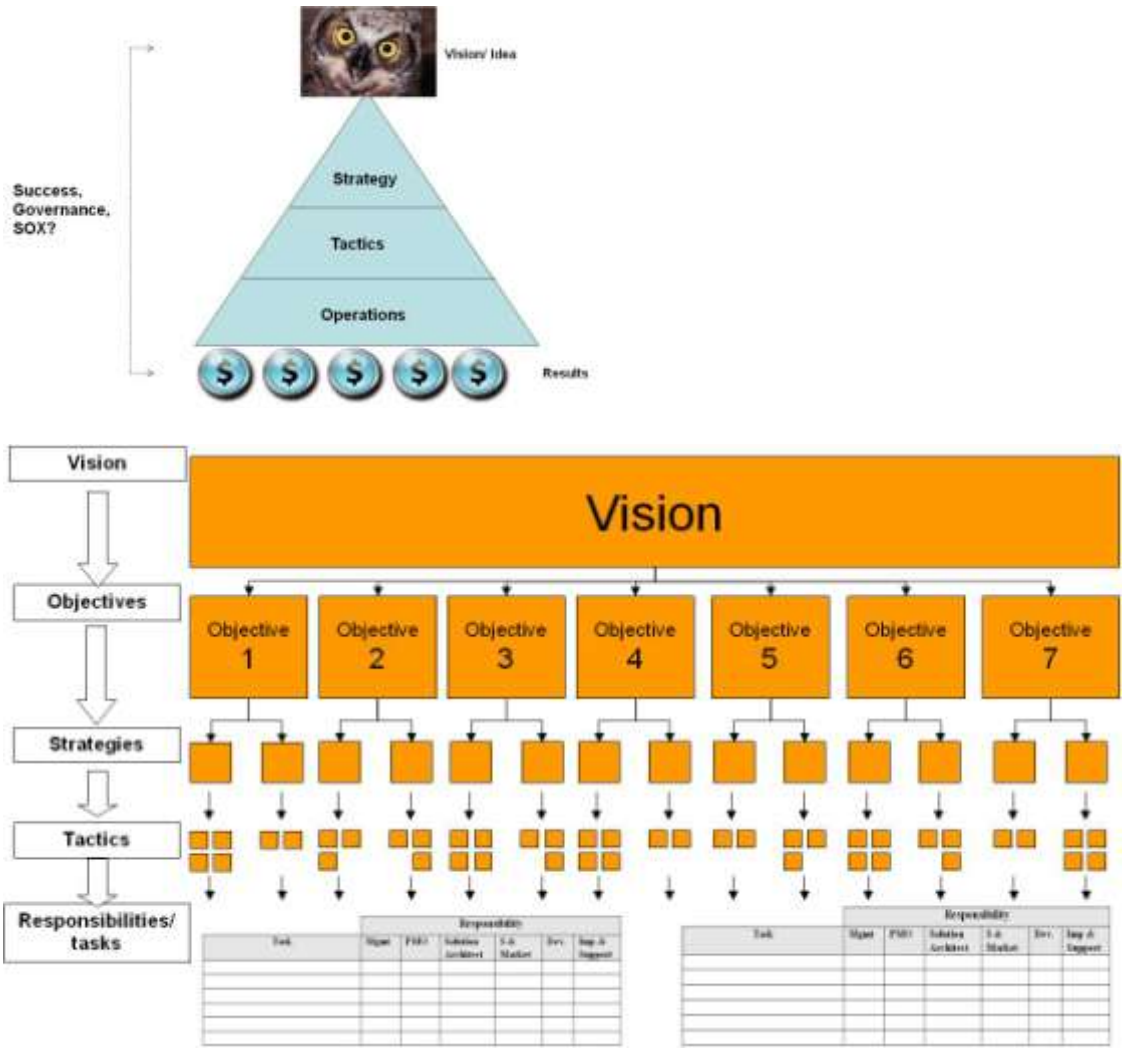

Figure 3 Journey from Ideas & Strategies to Practical Tasks

(Lake 2012) Mission, Vision are what describe the long term purpose of a business or an organization and is usually short and easy to grasp. All people, processes, technology etc associated with an organization should opt to achieve these and this in turn help provide streamline all the efforts in the same directions. In addition, these help in attracting employees, partners, customers and others. Still in long term *Objectives* are more concrete and actionable directions while *strategies* are what help in focusing and achieving the objectives. Strategies are conceived in a context and not alone (Mintzberg, Raisinghani, & Theoret 1976). This, suggesting strategies are taken as pattern in the stream of decisions. *Tactics* though comparatively short term is as the term apply deals with maneuvering in solution space in helping to fulfill the goals set by strategies.
Operations are the organization of all these in to *tasks, responsibilities and roles.*

2.1.5 Organization Culture and Values

Values are somewhat recognizable and permanent individual and collective behavioral patterns or attributes that are major contributors in creating a culture - our broad tendencies to prefer certain states of affairs over others (Hofstede 1980) (Schein 1996).
Organizational culture can be termed as a set of beliefs, values, and assumptions that are shared by members of an organization (Schein 1996). As mentioned these incorporated values have an influence on the behavior of organizational members for guiding their decisions and behaviors (Schein 1996) (Gregory, Harris et al. 2009; Hartnell, Ou et al. 2011)
Here follows a description of competing values framework (Kimberly and Quinn 1984) that describing typical culture types with their relevant values, beliefs, behaviors and criteria.

Table 1 Adapted from Competing Values framework (Kimberly and Quinn 1984).

Culture Type	Assumptions	Beliefs	Values	Artifacts (behaviors)	Effectiveness Criteria
Clan	Human affiliation	People behave appropriately when they have trust in, loyalty to, and membership in the organization.	Attachment, affiliation, collaboration, trust, and support	Teamwork, participation, employee involvement, and open communication	Employee satisfaction and commitment
Adhocracy	Change	People behave appropriately when they understand the importance and impact of the task.	Growth, stimulation, variety, autonomy, and attention to detail	Risk-taking, creativity, and adaptability	Innovation
Market	Achievement	People behave appropriately when they have clear objectives and are rewarded based on their achievements.	Communication, competition, competence, and achievement	Gathering customer and competitor information, goal-setting, planning, task focus, competitiveness, and aggressiveness	Increased market share, profit, product quality, and productivity
Hierarchy	Stability	People behave appropriately when they have clear roles and procedures are formally defined by rules and regulations.	Communication, routinization, formalization, and consistency	Conformity and predictability	Efficiency, timeliness, and smooth functioning

2.1.6 Social Identity Theory and Self-Categorization

Social identity theory (SIT) is seen as one of the most influential theories which explains intergroup relations and group processes (Dovidio 2010). We know that humans have a need to belong that affects their behavior in need to belong or associate with a group. In terms of social psychology, SIT describes the way people think about themselves and others in an intergroup context. SIT has three major constituents - 1. Self-categorization that is grouping oneself into a social category one identifies with thus creating the concepts of in-groups and out-groups 2. Self-esteem that entails membership in a particular group must hold some value 3. Level of commitment to their in-group. In this way people may exhibit favoritism towards their in-group and discriminate against the out-group. Different social contexts may trigger different thinking, feeling, and acting based on personal and/or group identities.

In an authentic online article (Moss 2008) it explains that individuals can develop two principal identities: a personal self, which encompasses unique, idiosyncratic information about themselves, and a collective self, which encompasses information about the group/s to which they belong (Tajfel 1972).

Figure 4 Group/ Team Memberships & Effects of their Norms

In this flux of identities, individuals perceive and decide how they feel committed to or attached to a specific group as well as the status and characteristics of this group relative to other social categories (Turner, Brown et al. 1979; Robinson and Tajfel 1996). A footballer, for example, might perceive himself as committed to his club as well as regard his club as more professional and moral than rival teams and other sports.

In addition individuals can also feel attached to other identities such as human, ideological, political, regional, national and more others. Vast multidisciplinary research spanning on many decades reveals that this perception of individual can have an substantial impact on individual and group processes such as Attraction-Selection-Attrition (ASA), behavioral integration, diversity, creativity, conflict, leadership etc. (De Cremer, Van Dick et al. 2011; van Knippenberg, Dawson et al. 2011; Vora and Markoczy 2012). This has significant relevance for this study of team process, diversity, and firm performance.

2.1.7 Team and Team Processes

The common perception of term Team and Teamwork is something like a special group of people who have some close bond or linkage and are working for something special. One of the more authentic definitions of team is a small number of people with complementary skills who are committed to a common purpose, performance goals, and approach for which they hold themselves mutually accountable. In addition, regular communication, coordination, distinctive roles, interdependent tasks and shared norms are important features of teams (Bowers, Salas et al. 1992; Katzenbach and Smith 1993; Thompson 2008). A working group by contrast consists of people who work and share ideas with each other, but are neither interdependent nor work with the comparable intensity and structure for a common goal as a team does.

Many team categorization may be possible like Normal (physical) teams, Virtual teams, Top management team, Prime minster and his/cabinet and more; still they in terms of team processes encompass or share a common scheme. These teams can be viewed as a three-stage system where they utilize resources (input), maintain internal processes (throughput) and produce specific products (output). With respect to this model, the necessary conditions or input together with the team processes or throughput of maintaining teams define the characteristics of effective teams. While analysis of these prevalent conditions and team processes often highlight issues for team development and training. The outcomes or output that a team is set to produce are generally used to judge or evaluate team effectiveness. In another way this can be depicted for example through integrated model for successful team performance (Thompson 2008) as under:

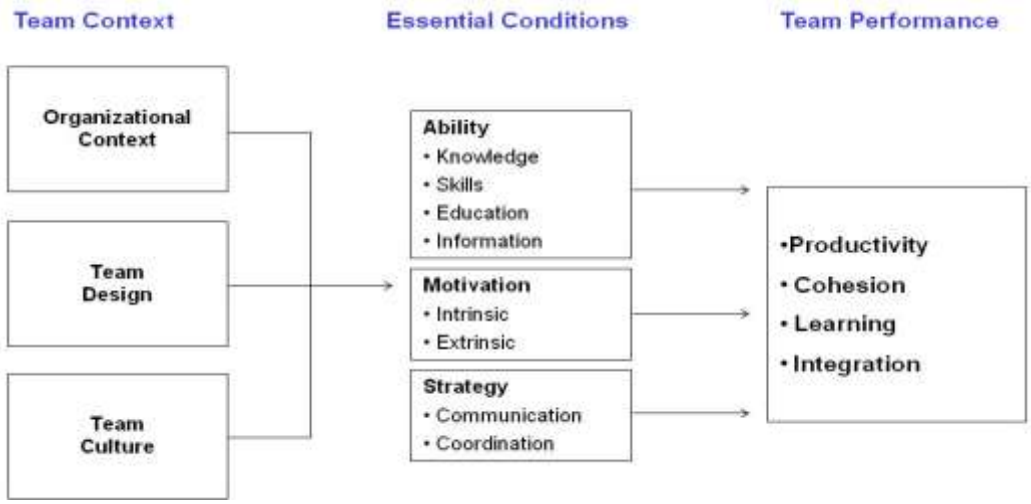

Figure 5 Integrated model for Successful Team Performance n (Thompson 2008)

This modeling may look basic as compare to Upper Echelon model for top management teams or Competitive Dynamics Models as described in the next section – which in essence can also be viewed as integrated models of teamwork and their outcome in a broader sense.

As evident from the discussion so far team are multi-facet & multi-disciplinary research area covering areas of organization, leadership, group dynamics, psychological, social sciences and more. Therefore, in terms of relevant theories, only those that are relevant will be discussed in the light of construct and factors used in the study. Particularly with respect to team input, processes and output. For studying team as a system of human group and behavioral dynamics one useful theoretical model is The Homans Model of Work Group Behavior (Lawrence and Seiler 1965)

For Team Development the model Bruce W. Tuckman published in his article entitled 'Developmental Sequence in Small Groups' in 1965 has had significant influence. It was simple to grasp, was effective to implement though with wider application some of its limitation were also surfaced. The initial description of the model focused on two realms of group development: interpersonal relationships and task activity. With this Tuckman hypothesized a four stage model 'forming, storming, norming, and performing' in which each stage needed to be successfully navigated in order to reach effective group functioning. The model was updated in 1977 to include a 5th stage 'adjourning (Bonebright 2010; Tuckman 2010). Here follows a good description of these stages from D. A. Bonebright's article '40 years of storming: a historical review of Tuckman's model of small group development'

1) **Forming :** The first stage of the model is 'testing and dependence'. In this stage, the Group becomes oriented to the task, creates ground rules, and tests the boundaries for interpersonal and task behaviors. This is also the stage in which group members establish relationships with leaders, organizational standards and with each other.

2) **Storming :** The second stage represents a time of intergroup conflict. This phase is characterized by lack of unity and polarization around interpersonal issues. Group members resist moving into unknown areas of interpersonal relations and seek to retain security. Tuckman stated that 'group members become hostile toward one another and toward a therapist or trainer as a means of expressing their individuality and resisting the formation of group structure'. In this stage, members may have an emotional response to the task, especially when goals are associated with self-understanding and self-change.

Emotional responses may be less visible in groups working toward impersonal and intellectual tasks, but resistance may still be present.

3) **Norming:** During the third phase, the group develops cohesion. Group members accept each other's idiosyncrasies and express personal opinions. Roles and norms are established. (Neuman and Wright 1999) describe this as a stage of developing shared mental models and discovering the most effective ways to work with each other. Tuckman stated that in this stage, the group becomes an entity as members develop in-group feeling and seek to maintain and perpetuate the group. Task conflicts are avoided in an effort to insure harmony.

4) **Performing:** In the fourth or final stage of the original model, the group develops 'functional role relatedness'. The group is a 'problem-solving instrument' as members adapt and play roles that will enhance task activities. Structure is supportive of task performance. Roles become flexible & functional, and group energy is channeled into the task.

5) **Adjourning:** In the fifth or final stage which emerged in the revised model by Tuckman and Jensen from 1977, the emphasis is on wrapping up the project, and task performance is no longer the priority of the team. Team members may feel happy about accomplishing the mission, but sad about the loss of friendship and association as well as feel heightened emotionality, strong cohesiveness, and depression or regret over team disbandment. As a way of achieving closure and completeness, it may be helpful for the team leader to celebrate the disbanding of the team by honoring team members, providing plaques and/or awards for a job well done (Gilley, Morris et al. 2010).

2.2 Literature Review

2.2.1 Upper Echelon Theory

With its roots in psychology, social sciences and business management UET was originally postulated by Hambrick & Mason in 1984. They argued that senior executives in a company serve as an interface between their respective organization and its environment, thus their decisions and actions are most likely to impact the performance and strategic direction of their company (Hambrick Finkelstein, & Mooney, 2005). In a revisit to the theory (Carpenter 2004) Mason proudly mentioned that the study's citation in over 500 per 2004 subsequent

refereed journal articles reflects its formidable impact and far-reaching scope. In an update to the theory (Hambrick 2007) wrote that the refinements to the theory since its inception have strengthen it's predictive nature. According to him the most notable refinements were the addition of two mediator factors by himself and his co-researcher such as managerial discretion and executive job demands.

Some relevant questions on certain aspects of the theory are raised (Nielsen 2010) which will be discussed later in this section, still the multidisciplinary nature of the Theory is both its strength and its weakness. Following depiction is based on Mason's new handbook on TMT (Carpenter 2011) where Casual Pathway is an addition to the original model.

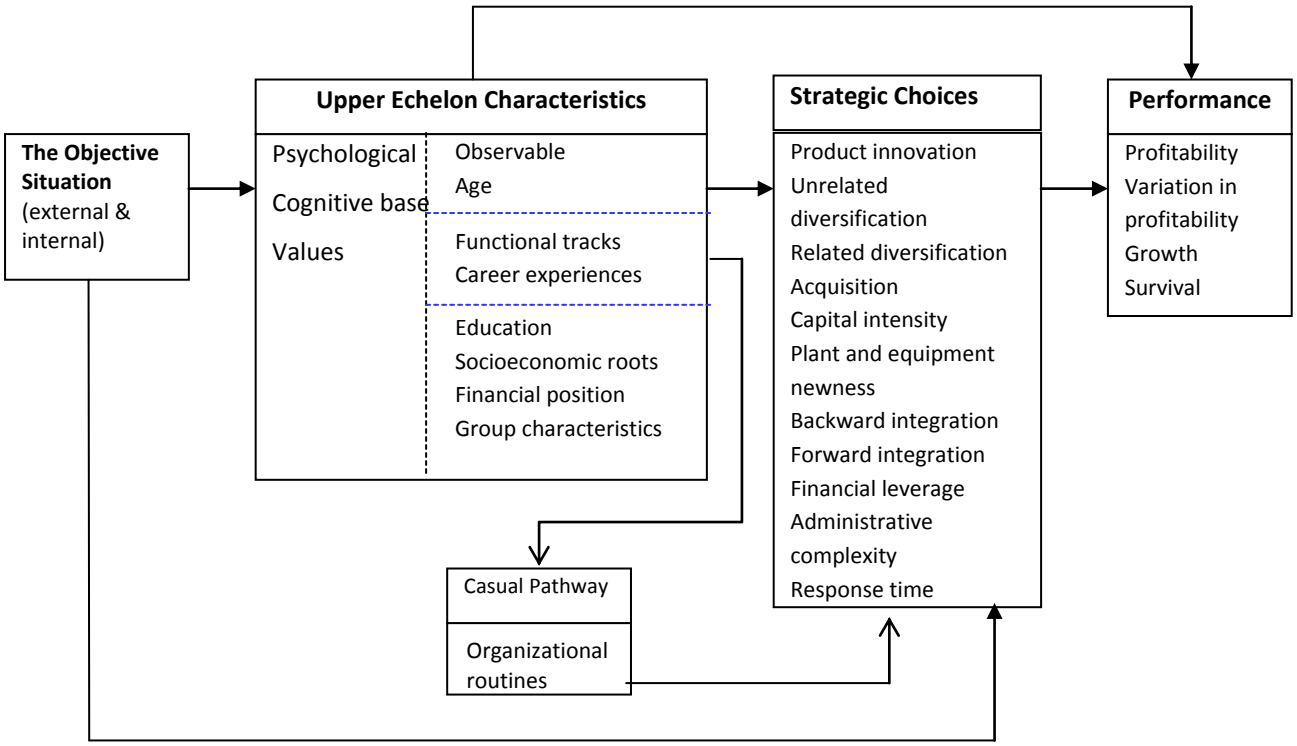

Figure 6 Upper Echelon model adapted from Carpenter and Hambrick 2004

UET model provides a theoretical perspective and a methodology with respect to three important areas that are - 1. strategic choices made in firms are reflections of the values and cognitive bases of powerful actors, 2. the values and cognitive bases of such actors are a function of their observable characteristics like education or work experience, and as a result 3. significant organizational outcomes will be associated with the observable characteristics of those actors. These three central tenets frame the UE proposition that an organization and its performance will be a reflection of its top managers and provide a basis for studying underlying team dynamics by demographic proxy.

The model centers on executive cognitions, values, and perceptions and their influence on the process of strategic choice and resultant performance outcomes. As this is difficult to measure top executive's internal mental states, values and perceptions therefore UE is invoked based on prior research on demography and suggests that managerial characteristics are reasonable proxies for underlying differences in cognitions, values, and perceptions.
The diversity related characteristics such as age, functional background, and educational experiences are next taken as observable proxies for the psychological constructs that shape the team's interpretation of the internal and external situation and facilitate formulation of appropriate strategic alternatives.

The prominent role of psychological constructs, such as values and perceptions, are attributed to executives' bounded rationality. What's more, managers are expected to economize on these efforts by working collectively as a team. In turn, H&M propose that demographic impact on cognitive processes will subsequently be revealed in strategic outcomes. Thus, the third box reports a range of strategic variables, from innovation to response time that is expected to reflect executive team characteristics. Therefore, H&M's model predicts that resultant organizational performance, gauged along a number of dimensions from profitability to the firm's basic survival, will ultimately be impacted. (Hambrick 2007; Hartnell, Ou et al. 2011; Klein, Knight et al. 2011)

Critique

Despite the widespread impact of H&M's research, it is surprising that only few comprehensive reviews of the UE literature exist (Nielsen 2010; Joshi, Liao et al. 2011). A consequence of the proliferation of UE studies, combined with the lack of methodological review articles, has resulted in a large body of literature that lacks integration. From such discussions it revealed that UE findings, particularly in terms of the consequences of TMT heterogeneity, have been inconclusive. In essence, the question whether diversity in managerial backgrounds is advantageous for companies still remains open.

Future?

It is definitely evolving and together with other theories is making itself relevant to analyze current business and team dynamics (Carpenter 2011). For this research the UE combined with Competitive dynamics, Diversity and Team processes are an effective entrepreneurial framework that is useful both in qualitative as well as quantitative research.

2.2.2 Resource Based View/ Theory

The RBV of the firm has been around for over 2 decades and was originally developed as a complement to the industrial organization (IO) view with Bain (1968) and Porter (1979, 1980, and 1985). In a nutshell RBV suggests that resources heterogeneity that a firm has access to have significant effect on its performance and value creation (Amit and Schoemaker, 1993; Barney, 1991; Peteraf, 1993). (Yang and Konrad 2011) The main research question of resource-based theory is performance heterogeneity among organizations (Barney & Clark, 2007). This perspective views organizations as consisting of a variety of resources, generally including four categories of capital resources: physical, financial, human, and corporate (Barney and Clark 2007). Since resources can either facilitate or inhibit firms from efficiently conceiving and implementing business strategies, the attributes of resources held by firms determine firm performance heterogeneity. Resources that allow a firm to conceive and implement strategies that improve its efficiency and effectiveness are viewed as valuable, and can be a source of competitive parity (Barney, 1989). Resources that are valuable and rare or valuable and are possessed only by a small number of firms, can be a source of competitive advantage. Resources that are valuable, rare, and inimitable, can be a source of sustained competitive advantage (Barney & Clark, 2007). Moreover, to achieve a sustainable competitive advantage (SCA), a firm needs to have the ability to exploit the full competitive potential of its valuable, rare, and inimitable resources (Barney & Clark, 2007). Such ability often resides in the firm's structures, procedures, and practices. The manifestation of the theory can be seen in the following depiction.

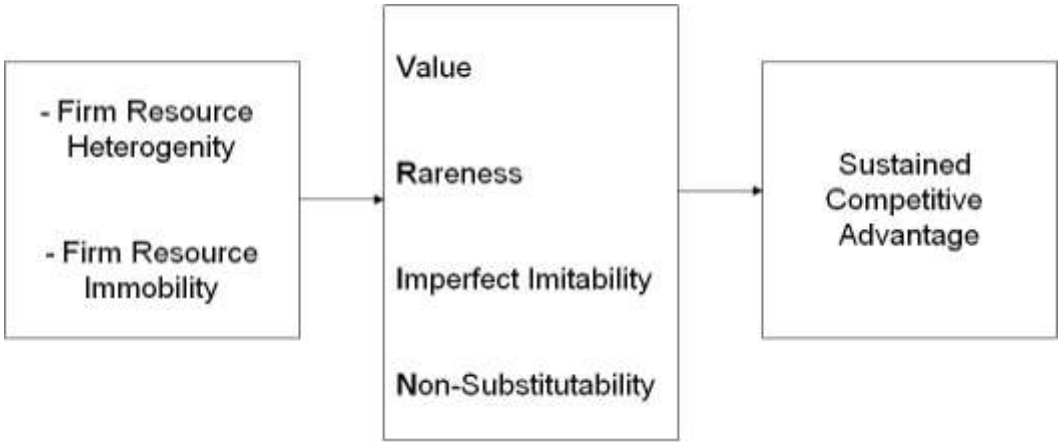

Figure 7 VRIN/ VRIO analysis framework (Barney and Clark 2007)

With the help of VRIN/ VRIO analysis framework (Barney and Clark 2007) one can qualitatively find out what sustained competitive advantages the firm have or should have. There exist mathematical and statistical implementations of the model. Here follows an example of its usage (Barney and Clark 2007).

Table 2 VRIN/ VRIO Analysis Framework Adapted from Barney 2007

Is a resource or capability....					
Valuable?	***Rare?***	***Costly to Imitate?***	***Exploited by the Org?***	***Competitive implications***	***Economic performance***
No	---	---	No	Competitive disadvantage	Below normal
Yes	No	---		Competitive parity	Normal
Yes	Yes	No		Temporary competitive advantage	Above normal
Yes	Yes	Yes	Yes	Sustained competitive advantage	Above normal

Critique

Important to look for what founders of the theory suggest both in the RBT book of 2007 and in an interesting recent article - The Future of Resource-Based Theory : Revitalization or Decline? (Barney and Clark 2007; Barney, Ketchen et al. 2011). Among other things they admitted that there are shortcomings pertaining to method and measurement issues Within Resource-Based Theory.

The critiques fall into eight categories: (a) the RBV has no managerial implications, (b) the RBV implies infinite regress, (c) the RBV's applicability is too limited, (d) SCA is not achievable, (e) the RBV is not a theory of the firm, (f) VRIN/O is neither necessary nor sufficient for SCA, (g) the value of a resource is too indeterminate to provide for useful theory and (h) the definition of resource is unworkable. One can argue that the first five do not really threaten the RBV's status. They are incorrect or irrelevant or apply only when the RBV is taken to its logical or impractical extreme. However, the last three critiques offer more serious challenges that need to be dealt with if the RBV is to fully realize its potential to explain SCA, especially beyond predictable, stable environments.

Future?

RBT may lose ground for new theories and perspectives like dynamic Austrian framework and Dynamic Capabilities if it is not revitalized to address the critiques as well as to address the realities contemporary business and organizational environments face. (Barney and Clark 2007; Kraaijenbrink, Spender et al. 2010; Barney, Ketchen et al. 2011)

2.2.3 Competitive Dynamics

The importance of this theory in addressing challenges that other theories mentioned cannot be ignored. The views like dynamic, ever changing and competitive business environments such as inventory based theories like Resource Based View have difficulty in handling such multiple situation-based dynamic scenarios especially in terms of longitudinal studies. The promising dynamic capabilities perspective emerged as a theory in strategic management field (Teece, Pisano et al. 1997) and has flourished in recent years, for a variety of reasons because it offers a fine-grained approach to understanding what specific firms do when they compete with specific rivals.

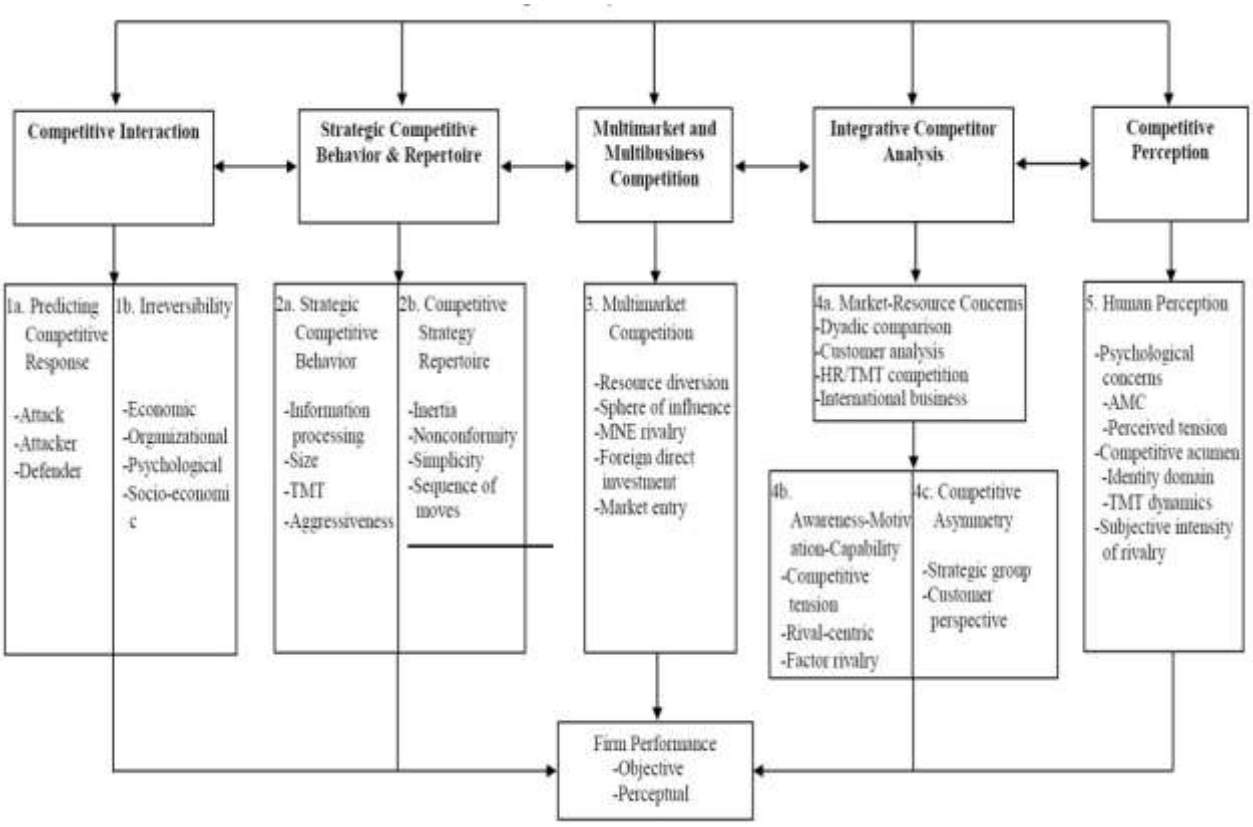

Figure 8 Dynamic Capability framework adapted from (Chen and Miller 2012)

Critique

In a recent article on the topic "Competitive Dynamics: Themes, Trends, and a Prospective Research Platform" the authors (Chen and Miller 2012) suggest that Competitive dynamics remains notably underdeveloped in several key respects and it lacks an integrative framework that can organize its many facets; its potential to bridge micro and macro perspectives within the discipline has not been realized; and it has yet to establish many fruitful links with other disciplines in the management field.

Future?

Even prominent scholars of other competing theories find Competitive Dynamics promising (Barney and Clark 2007; Barney, Ketchen et al. 2011). The main reason for this accommodation being as Competitive Dynamics promise a better understanding of situation by linking micro and macro perspectives a organizations find itself in, therefore if fine grained constituent of the theory are taken care of and sorted out for analysis – this will significantly help company dynamically revise its plan and position its competition (Wang and Ahmed 2007; Agarwal and Selen 2009; French, Thomas et al. 2009; Barney, Ketchen et al. 2011; Chen and Miller 2012).

2.3 Important Constructs and variables

Most of the latent variables explained here are measured through Likert-type scale ranging from 1 - completely disagrees, to 5 - completely agree or with a similar description like 1 – Does Not Apply At All to 5 - Completely Applies. This excludes diversity related operationalization. Survey questionnaire is attached in the Appendix.

2.3.1 Performance

Performance is a multidimensional concept and has wide application in almost every sphere of our personal, professional, business lives and even in after-life! Following outcomes are good measure of organizational performance – adapted from article (Carpenter 2004)

Performance

- Financial
- Market
- Social
- Innovation

Strategic

- Business/ Corporate
- International
- Change
- Strategic Interactions
- Policies

TMT/ Board

- Turnover & Composition

Most common measure of performance are financial and market related parameters such as market share and strength of market brand, still for many Startup these are yet not so useful measure of performance for obvious reasons. In this survey, there exists a dedicated three-item construct as Q1 for (Self Perceived) Team Performance e. While following the approach as mentioned above other questions in the survey may also serve proxy for performance like Q5 that measures entrepreneurial (team) orientation and Q 8 & 9 that together form sociobehavioral integration of TMT. All these have theoretical support (Simsek 2005; Covin, Green et al. 2006; Chen, Lin et al. 2010; Covin and Lumpkin 2011). While other indirect

measures like number of full time employee, number of patents, venture financing and similar ones can be indicative if supported in the literature.

2.3.2 Diversity

One of the main reason that makes diversity a fascinating field to study both in general and especially in the context of teams is due to its importance and for easy availability of rich quality predictive indicator and their application. In addition, huge amount of research work is readily available on different dimensions of the diversity which one can build his/ her work on and still there is limitless potential in the field when it comes to consolidating different diversity related viewpoints, theories and ways to construct diversity measure (Nielsen 2010; Budescu and Budescu 2012). As the field is still evolving, it is up to researcher's subjective judgment what measure to use, though objective measure and guidelines (Harrison and Klein 2007) are also available to help finding the outcome diversity parameters in a given situation and for how long and with what intensity. Diversity is central in all three theories mentioned so far – Upper Echelon, Resource Based View & Competitive Dynamics (Nielsen 2010; Yang and Konrad 2011).

Diversity on cognitive base is probably the most studied aspect in Upper Echelons research (Carpenter et al., 2004; Nielsen, 2010). There are interesting diversity models from business, psychology, social-psychology for example 'model psychological processes underlying diversity' (De Cremer, Van Dick et al. 2011), still many of these do not address the main challenge in Diversity Research that is providing a coherent and integrated diversity model with more universal and comparable operationalization. This is one of the main reason that a relationship between diversity and TMT performance is yet to be fully established - though a few solid efforts have begun making significant impression on the diversity research (Harrison and Klein 2007; Nielsen 2010; Thatcher and Patel 2011; van Knippenberg, Dawson et al. 2011; Budescu and Budescu 2012). In addition, the author hopes that advance statistical modeling techniques like Structural Equation Modeling (SEM) and Partial Least Square (PLS) will be helpful in making this journey short and enjoyable (Kaplan 2009; Esposito Vinzi 2010). In addition, the container terms like surface-level diversity points out to feature that are easily noticeable like those known as demographic features in contrast to deep level diversity that is hidden or is of cognitive nature for example Values or Polychronicity. These two levels may be linked somehow.

Diversity Construct and TMT Focus

After going through more than 70+ articles mostly focusing on different demographical aspects of diversity, the author found one of the most inclusive definition that has the potential of fulfilling many aspects of the concept, though not all the aspects. Keep in mind that diversity is a complex construct of multidimensionality with multidisciplinary application – it is in use in psychology, sociology, ecology, biology, management, politics etc.

- As a unit construct diversity is the distribution of differences among the members of a unit with respect to a common attribute, X (Harrison and Klein 2007).

This definition seems to handle demographic aspects such as age, gender, ethnicity or team level such as educational, functional, conscientiousness, task attitude, or pay. This is equally useful in other fields like ecology and biology with other species.
Harrison and Klein in their famous article of 2007 what's the difference? Not only described diversity as at least three dimensional construct such as Separation, Variety and Disparity.

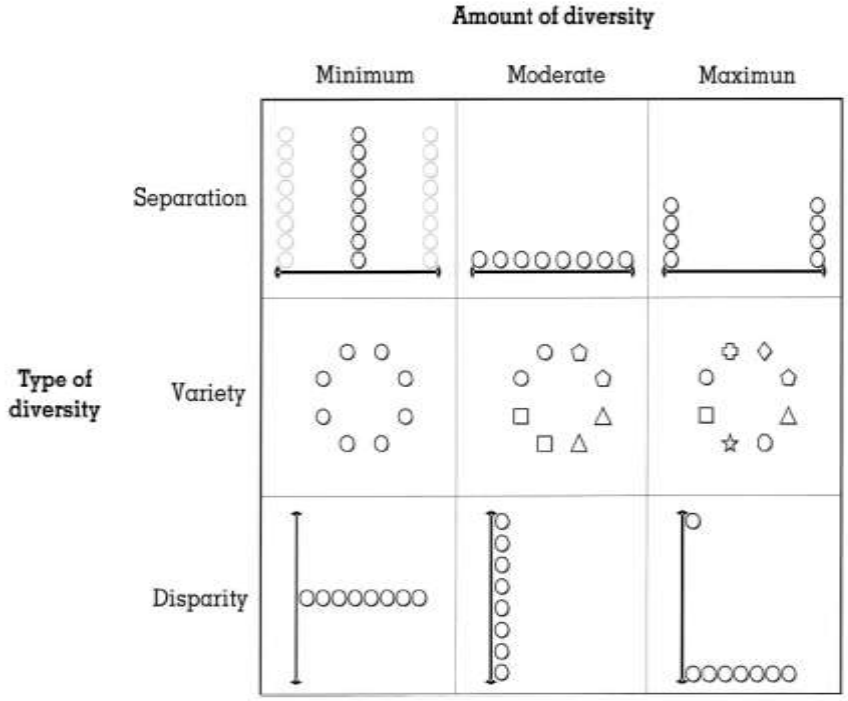

Figure 9 Three types of diversity and their measurement (Harrison and Klein 2007)

Separation: refers to differences or disagreements on attitudes or opinions among members of a population (e.g., disagreements along ideological lines among political parties),
Variety: it captures differences in group composition in a population on some categorical variable (i.e., race, religion, eye color, etc.)

Disparity: refers to dispersion along a hierarchical continuum within a particular setting (such as differences in pay, benefits, wealth, status, power etc.)

Here follows a complete list over different demographic constructs, their level of analysis and how to measure them. Individual are easier to grasp, while Relational are relative to the work

Table 3 Demography Constructs at Different Levels (Joshi, Liao et al. 2011)

Demography Construct	Level of Analysis	Operationalization
Individual demography	Individual	Individual scores of demographic attributes
Relational demography (1)	Individual	D-score (Euclidean distance)
Relational demography (2)	Cross	Interaction of individual demographic attribute × demographic composition of unit
Relational demography (3)	Individual	Perceived dissimilarity
Unit diversity—separation	Unit	Standard deviation
Unit diversity—variety	Unit	Blau's index or Teachman's index
Unit diversity—disparity	Unit	Coefficient of variation or Gini coefficient
Unit diversity—faultline	Unit	Faultline strength

Practical Research Guide Lines

As many as 10 useful research guidelines from the authors on diversity are listed in Appendix and from the same ones following operationalization is provided here for reference. The author utilized these types in measuring educational and functional diversity of TMT teams in this survey. In terms of operationalizing these three types, following formulas calculated & saved them as variable using IBM SPSS – through after some efforts.

Table 4 Operationalization of Within-Unit Diversity type (Harrison and Klein 2007)

Diversity Type	Index	Formula	Minimum to Maximum	Assumed Scale of Measurement
Separation (on attribute S)	Standard deviation	$\sqrt{[\Sigma(S_i - S_{mean})^2/n]}$	0 to $[(u - l)/2]$	Interval
	Mean Euclidean distance	$\Sigma\sqrt{[\Sigma(S_i - S_j)^2/n]}/n$	0 to $[(u - l)/\sqrt{(2)}]$	Interval
Variety (on attribute V)	Blau	$1-\Sigma p_k^2$	0 to $(K - 1)/K$	Categorical
	Teachman (entropy)	$-\Sigma[p_k \cdot \ln(p_k)]$	0 to $-1 \cdot \ln(1/K)$	Categorical
Disparity (on attribute D)	Coefficient of variation	$\sqrt{[\Sigma(D_i - D_{mean})^2/n]}/D_{mean}$	0 to $\sqrt{(n - 1)}$	Ratio
	Gini coefficient	$(\Sigma\lvert D_i - D_j\rvert)/(2 \cdot N^2 \cdot D_{mean})$	0 to $1 - (1/n)$	Ratio

Note: For separation (S) and disparity (D), the diversity attribute is continuous and can range from a lower bound of l to an upper bound of u. Theoretically, l can be $-\infty$ for separation attributes and (commonly) 0 for disparity attributes, while u can be $+\infty$ in either case. Operationally, l and u are limited by the instrument used to measure the attribute in question. For variety (V), the attribute is nominal or discrete. It can take $k = 1, \ldots K$ possible categories.

Two main challenges with the categorization from Harrison and Klein (2007) though somewhat addressed in their guides lines are making a choice; what category of diversity one want to measure and secondly the resulting effect when taking in to account all diversities active at a given time or situation. It was a struggle to align survey questions according to the categories they should adhere to. This was not an easy chore and indicate more reading and focus is required when designing and doing data collection/ analysis work (Harrison and Klein 2007; Bell, Villado et al. 2011; Thatcher and Patel 2011; Budescu and Budescu 2012)

Table 5 The diversity questions & separation, variety and disparity

Diversity Related Questions	**Type of Diversity**	**Comments**
Q 20. Please rank a maximum of three types of diversities you consider as most important for the success of a management team: Education, Functional, Social, Cultural, Experience (Other), Age, Gender (Respondents who chose Other wrote Experience in there)	**Separation**	**What about following questions: do they fall in to 'Separation' among Teams?** Q 1. Team Performance Q 2. Strategic Decision Speed Q 3. Multitasking Q 4. Team Atmosphere Q 5. Team Orientation Q 6. Strategic Decision Comprehensiveness Q 7. Time Orientation and Rhythm Q 8. Team Integration - Interpersonal Interaction Q 9. Team Integration - Task-oriented Interaction
Q 12. What is your age? 18 – 23, 24 – 30, 31 – 40, 41 – 50, 51 – 60, 61+ Q 13. What is your gender? Female , Male Q 17. How many of the top management team including you have completed following educational degrees? Bachelor , Master , Ph.D. Q 19. How many members of the top management team fulfill the following functional roles? Engineering, Finance , Human Resources , Marketing, Operations, Research & Development , Other Functional Roles 22. Please indicate the industry the company is operating in: Normalized to: 1= Biotech, 2= Energy, 3= ICT, 4=Industry, 5=Other Tech., 6= Others.	**Variety**	**What about following questions, do they fall in to 'Variety' among Teams ?** Q 10. Workload defined by premises in the past (in %) Q 11. Workload defined by premises set for future activities (in %) Q 16. How many members is part of your top management team? Q 18. What is the cumulative number of years of industry experience within the management team, including former Employments? Q 23. How many people work full-time for the company? Q 24. Is the company located within a university incubator (e.g. technology park, science park, etc.)? Q 25. Has the company received any of the following findings:

Q 15. What is the CEO's ownership percentage in the company, approximately in %? Q 17. How many of the top management team including you have completed following educational degrees? Q 14. How many years of experience do you have as top leadership team member?	**Disparity**	**What about following questions, do they fall in to 'Disparity' among Teams ?** Q 26. How many patents does the company currently hold or has applied for? Q 27. Does the company cooperate with direct competitors as business partners (e.g. as suppliers, buyers, Subcontractors)?

2.3.3 Behavioral - Sociobehavioral Integration

Organizational behaviors build upon individual and group counterparts that can be somehow explained by psychological and socio-psychological sciences – theories pertaining motivation, self-determination, identity, group and many more. Still the main theme is at the micro level one can identify multitude of behaviors pertaining individual, groups and firm as a whole (Brotherton 1999; De Cremer, Van Dick et al. 2011; Chen and Miller 2102). Now with this in mind for teams and especially TMT in a competitive startup environment behavioral integration or a dynamic response patterns in terms of reaction to events, work ethics, decision making, cooperation, competitiveness is of importance. This study also focuses on sociobehavioral integration or the degree to which TMT members work together as a team (Simsek 2005; Bird, Brandt et al. 2009; Carpenter 2011). The findings from Hambrick et al. (1996) suggest that demographic heterogeneity among TMT members facilitated proactive actions but hindered response behavior which in turn resulted in significant response lag.

For the study the two important sociobehavioral integration dimension are separately operationalized based on established research (Smith, Smith et al. 1994; Tsui and Farh 1997; Simsek 2005). These are measure by a five point Likert-type scale ranging from 1 (completely disagree) to 5 (completely agree). In the survey questionnaire as attached here in the Appendix, Q8 and Q9 were devised to measure these dimensions.

Interpersonal interaction **-** This is about how often and with what quality the TMT member interact with each other at personal level and is based on three-item questions.

Task-oriented interaction – this entails the interaction related to work and tasks – at the professional level when problem solving, discussing, making decisions or doing day to day chores. For this study it is measured through five-item questions.

2.3.4 Team Atmosphere

Team Atmosphere or team cohesion or trust is how well the member feels about the working environment of the team. The literature has described this atmosphere as one of true internal collaboration between group members that goes beyond mere communication and information exchange (Katzenbach and Smith 1993; Miles, Miles et al. 1998; Thompson 2008; Carpenter 2011). In a sense it is a shared organizational context for knowledge transfer and integration, including both physical components like office environment, coffee machines, cantina etc as well as virtual components for example IT equipment, e-mail.

Team leaders must recognize that team members may have different expectations and assumptions about how team will or should function, therefore there need to be team processes in place through which differing expectations are resolved. Hopefully the climate or atmosphere in the team if perceived to be trusting & supportive, then a shared belief that the team is safe for interpersonal risk-taking will become "team norm". Thus proactive and creative team members will be catalyst for better team performance (Thompson 2008; Chen, Lin et al. 2010; Mastrandrea and Taticchi 2010; Tuckman 2010).

In the survey questionnaire, team atmosphere is measured in Q4 by a four-items construct where each item spans on a five point Likert-type scale ranging from 1 (Never) with 3 in middle (Sometimes) and 5 (Extremely Often or Always).

2.3.5 Entrepreneurial/ Team Orientation (EO)

This concept or construct refers to the strategy making/ building processes that provide organizations with a basis for entrepreneurial decisions and actions. In the context of entrepreneurship, it is degree of being innovative, proactive and risk-taking. There is substantially good research on the topic of entrepreneurial orientation (EO) (Lumpkin and Dess 1996; Lumpkin and Dess 1996; Wiklund and Shepherd 2003; Covin and Lumpkin 2011). In the context of survey for this research this term is referred as "team orientation" after getting a feedback from pilot survey users that suggest the term "entrepreneurial" is

sometimes misunderstood in Norway. This is because in Norwegian language a similar word "entreprenør" is used for companies operating in the field of building & construction projects. Moreover entrepreneurship is yet to fully established as a conceptual term in Norwegian society while the term "Gründer " in Norwegian language somehow convey what entrepreneurship stands for, though not fully (Jan Inge Jenssen 2006).

This is now established through empirical studies that there is a relationship between EO and Performance, however the magnitude of the relationship seems to vary across studies (Dess and Robinson 1984; Lumpkin and Dess 1996). In an environment of rapid change and shortened product and business model lifecycles, the future profit streams from existing operations are uncertain and businesses need to constantly seek out new opportunities. Therefore, firms may benefit from adopting an entrepreneurial orientation. Such firms innovate frequently while taking risks in their product market strategies (Miller & Friesen, 1982). Firm's efforts to anticipate demand and aggressively position new product & service offerings usually result in stronger performance (Ireland, Hitt et al. 2003). With rapidly changing market and business conditions this is more true than ever before, though the cost and effort are often more complex and higher in magnitude too.

For this study the author has developed with the help of literature 5-items construct that measured Entrepreneurial (Team) Orientation as per Q5 in the questionnaire.

2.3.6 Strategic Decision Process

Looking broader than this research the decision making processes are the most interesting & fundamental processes or activities that human being get involved in on somewhat regular basis. In simple terms it these processes involves gathering information, evaluating available alternatives and making "reasonable" choices.
In the context of a startup and its leadership/TMT this is the most important task that shall have a direct effect on the strategic direction, performance as well as on day to day operations. Strategic decision-making is a multidiscipline field that embraces theories from Psychology, Social Anthropology, Mathematics, Business, Economics, and many others.

The act of decision-making can be modeled as a three-stage process consisting of acts of motivation, thinking and deciding. This in itself is a vast science and here established construct-items that can be used in surveys are utilized for covering two dimensions that are:

strategic decision making speed and strategic decision making comprehensiveness. The names of the terms is self explanatory and there exist enormous literature on these topics.

For this survey, question items were deduced from literature (Souitaris and Maestro 2010; Nielsen and Nielsen 2011) . The Q2 is a 3-item construct forming Strategic Decision Making Speed while Q6 is 5-items for Strategic Decision Making Comprehensiveness.

2.3.7 Polychronicity

This explores the extent to which people in a culture prefer to be engaged in two or more tasks or events simultaneously assuming this to be the best way of doing things (Hall 1960; Lee 1999). In simple terms, people can organize or perform their activities in two different ways:

- Monochronically: involvement in events one event at a time; and
- Polychronically: involvement in two or more events at the same time.

For TMT the definition from (Lee 1999; Bluedorn and Jaussi 2008; Souitaris and Maestro 2010) is adapt and that suggest Polychronicity is the extent to which TMT members Mutually prefer and tend to engage in multiple tasks simultaneously or intermittently instead of one at a time and believe that this is the best way of doing. People who have worked in competitive business environments have seen or themselves experienced that managers in more polychromic TMTs extensively switch their attention between simultaneous or intermittent task engagement - as new and critical issues that need to be addressed or opportunities that ask for their attention (Kotter 1982). In contrast managers in less polychromic teams control attention switching with techniques such as quiet times and appointment schedules in order to work on task lists sequentially (Griessman 1994). In essence, TMT Polychronicity is an important concept as strategy and resource allocation domains because it reflects how top managers allocate their most valuable scarce resource that is their own time.

This construct and question items used are based on the work of (Bluedorn and Jaussi 2008; Souitaris and Maestro 2010). Polychronicity/ multitasking is measured through Q3 in the survey questionnaire under study.

2.4 Detailed Theoretical Model for this study

The broad research question as described in section 1.2 can be further detailed to provide a direction for this study. The discussions will hover around two major areas for enquiry – top management team processes and diversity. In essence is a iterative process that entails exploring survey data to discover relationships, patterns, models and then build Propositions on that basis. The common goal for this is to learn, practice, and demonstrate important facet of teams in high-tech Startup. More importantly as an entrepreneur the author wanted to create "tools" and references that can be useful for the entrepreneur and researcher in the field. As mentioned there has been little research in Norway on the topics of Startup Teams in high-tech industry, Team Processes and Diversity. This in mind here follows the two approaches.

2.4.1 Explorative Approach

This intends to explore top management team (TMT) processes and what if diversity have any

Figure 10 Basic theoretical research model

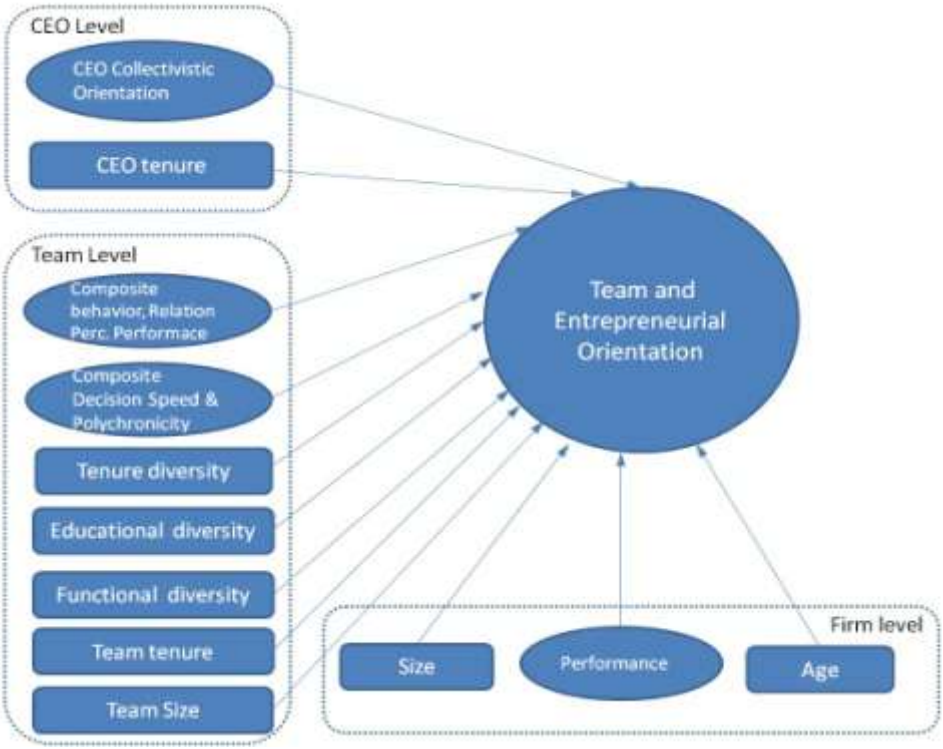

Figure 11 Broader Explorative Research Model with Focus on Diversity

influence on the performance of a high-tech startup? Actually, this exploration is done through out the whole research process, still mostly in chapter 3. The author has done extra efforts in analyzing the current data set, making sense of what it is and in finding right tools & techniques for the job.

The figure 11 depicts a broader research model that the author drafted after an extensive literature review (Carpenter 2004; Nielsen 2010; Budescu and Budescu 2012), but due to constrains of time and practical limitation in data collection, a full compliance to the model was not feasible. Still the model has been very helpful in conceptualizing propositions as well as presenting what limitation this current research has and in guiding future work.

2.4.2 Study Propositions

Here follows a list of propositions that are build on the literature and will be studied/ tested in some detail in chapter 4.

Table 6 Nine Propositions to be Studied/ Tested

Proposition 1:	Socio-behavioral Integration (SBI) can be utilized as a Performance measure
Proposition 2:	Entrepreneurial Orientation (EO) is positively correlated to Performance of a team.
Proposition 3a:	Faster Decision Making Speed (DS) will result in stronger Entrepreneurial Orientation (EO)
Proposition 3b:	Decision Making Comprehensiveness (DC) results better Entrepreneurial Orientation (EO)
Proposition 3c:	Polychronictiy (PC) is positively correlated to Entrepreneurial Orientation
Proposition 4a:	Age has negative and Gender has positive influence on Entrepreneurial Orientation (EO)
Proposition 4b:	The "variety" type of Educational and Functional diversities have positively associated with Entrepreneurial Orientation (EO)
Proposition 5a:	Gender (male) diversity has negative correlation with Decision Making Comprehensiveness.
Proposition 5b:	Growing age diversity has positive association influence with Decision Making Comprehensiveness (DC).

3 DATA & METHOD

As one decides whether to do qualitative or quantitative study the choice of data collection, analyses, interpretation and pertaining tools gets set. For this study, the quantitative method was chosen and this influenced both design and precision of data collection process as will be evident in following sections.

3.1 Survey as a method of data collection

Internet plays an important role in survey type data gathering (Denscombe 2007). This may be due to its relative ease of use, administration and cost-effectiveness as a data collection method (Lussier 2011). As compare to postal surveys, telephone surveys and face-to-face clipboard questionnaires it is a rather fast and cheap alternative when it comes to collecting data (Couper, 2000; Dillman, 2007). Internet surveys do not appear to have any significant distorting impact on the nature of the information that is provided by respondents. Still lacking thorough research at this point, so far what researchers have compared in terms of findings from internet-based and paper-based questionnaires the evidence suggest that there is no significance or in most cases no difference between the modes of delivery of questions to potential respondents (Denscombe, 2006; McCabe, 2004).
The response rate can be augmented when potential respondents are contacted in advance, especially where the contact involves a personalized form of message in which people are greeted by name. Even a planned follow-up of non-responses enhances the response rate just as it does with a postal survey (Dillman, 2007).

- Using the Internet, the survey can be conducted in one of four main ways:
- Email questionnaire – The questions are sent embedded in the email itself.
- Email and questionnaire document – The questionnaire document is sent as an attachment with the email.
- Web-based – The questionnaire can be designed as a web page and located on a host site, waiting for people who visit the site to complete it.
- Professional method – The questionnaire are still designed as a web page and a personalized email containing short instructions for the responders and a link pointing

to the questionnaire web page. A proper motivational cover letter from a relevant person of status or at least having the person as signature of the email may increase response rate and quality of answers.

3.1.1 Questionnaire

As with many other forms of written questionnaire, the response rate from Internet surveys is influenced by many factors where the main one are shortly described here (Ulhøi 2007; Klenke 2008; Mark Easterby-Smith 2008; Lussier 2011)

Importance and Incentives – the name of game is how well a respondent will perceive the importance of the survey he/she is asked to respond to both in terms of benefit for him/ herself or for the greater good, if it is something he must do, survey is sent by a person of stature or importance to the potential respondent etc. The most common motivational incentives are making a clear statement that the responses will be treated confidentially and anonymity of the responses be maintained, appreciating and thanking the respondents graciously, providing description of who will benefit from the survey/ research, promising making survey results available for the respondent. While making personal contact with respondents by telephone or email if possible may also help. In other cases extra measures like token gifts – cinema/ opera tickets, electronic gadgets may be evaluated.

Visual Appeal – this may influence to the motivation for responding as well stays while the questionnaire is being answered. Here simplicity should be preferred so the respondent stay focused on the questions rather than on colors and pictures, if these will not add value to respondents understanding.

Formulation & Language - how understandable are the instructions and questions in terms of professional language, length of text, and common language. Words with double meaning are avoided as well as lengthy texts are broken. Personalizing the survey related communication like invitation emails for each respondent is also seen as useful to increase the response rate.

Responses – it should be clear how the respondents are expected to answer both through instructions, but also through hints on valid answers like if word or numbers are expected and what is the valid range, how many choices respondent should make etc. If possible avoid open

questions in favor of multi-choice click-and-choose type where one or more out of many alternatives can be selected. Important decisions a researcher must take are measurement scale, making responses obligatory in terms of informing respondent that a response is required when incomplete answers are submitted or when respondent move back and forth through survey questionnaire.

Length – for longer surveys the quality of responses may decrease and user may like pass over questions to end the survey. A rule of thumb is to design importance and incentive part of the survey better if proposed surveys are expected to take more than 5 minutes of respondent's time.

3.1.2 Measurement Scale

The discussion of what scale of measurement is appropriate to use is very important as it will influence the choice of numerical as well as statistical techniques for transforming, analyzing and interpreting the data – thus influencing the quality of quantitative research and its findings (Grimm and Yarnold 2000; Field 2009; Lussier 2011; Huck 2012). In other words it starts from design of questionnaire and how the data will be captured through registered responses. Although most good books on research & of Statistics provide some insight in helping make right decisions, often the consequences become clearer after the data is already collected, then one must decide what transformation of data scale are allowed and how they should be carried out. Here follows a short description of measurement scales (Denscombe 2007; Lussier 2011) - it is worth mentioning that IBM SPSS will term Interval and Ratio as Scale. Most of survey question is the study fall in this category.

Nominal – when every possible response is assigned to a category, for example there is a head count of members of a particular category, such as male/female or categories like ethnic Norwegians, Immigrants, and Asian etc. These categories are based simply on names; there is no underlying order to the names. In terms of possible statistical operation and quality this the lowest level of quantitative data.

Ordinal – Although ordinal data resembles to ordinal type and based on counts of things assigned to specific categories, still for ordinal the categories stand in some clear, ordered, ranked relationship for example count of gold, silver and bronze medal in a competition; asking people to describe quality of a service in some ordered scale like worse, bad,

acceptable, good, best etc. Though we do not know the cause of the order, or by how much they differ, the ordered data is more comparable and many more statistical operations are possible in increasing the quality of analysis/findings. A relevant note is the mention of disagreement among researcher if it is up to 3-, 5- or 7-point Likert scale that be treated as ordinal data or one can "upgrade" 5- and 7-point measurement to interval scale.

Interval – though ordered still better because this type of data can be ranked on a scale, for example time & date of an event etc. This suggesting that the 'distance' between the categories is a known factor and will increase the quality of analysis over ordered data in terms of direct contrast and comparison and allows for numerical operations like addition & subtraction still no multiplication or division without a proper transformation.

Ratio – In this scale of measurement the categories exist on a scale which has a 'true zero' or another absolute reference point, for example weight, number of items, income & expanses etc. With such a highest level of data the researcher can do more numerical operations like multiplication & division to compare etc. Same is true for Statistics that offer more tools and techniques in analyzing such a highest level of data which ratios are.

3.2 Survey Design & Sample Group

As mentioned in introduction on the scarcity of this type of research in Norway while expecting that someone will be willing to share "their" dataset is even more difficult to achieve. The author have experienced long delays in terms of acquiring data from others for example data pertaining Norwegian Gazelle companies, fast growing startups that are ranked through yearly competition based on certain criteria (DagensNæringsliv 2009; Dun&Bradstreet 2009). Based on these experiences, the author decided to acquire fresh primary data and for this purpose self-administered Internet based survey was a smart choice – based on the reasons described in the previous section (Lussier 2011).

The sample group was top management team mostly CEOs at Norwegian high-tech firms and the final panel had 156 unique contact names and email addresses. Initially, the author wanted to include more than one top management team member in the survey, but after discussions, the author concluded that for this kind of study/ survey one needs larger data set and not necessarily more than one response from a single firm. Moreover, experienced researcher

advised that it is least likely that many TMT members from a single startup will invest their precious time in responding the survey.

3.3 The Questionnaire

As attached in the Appendix the questionnaire consisted of 31 main questions including the last one where respondents optionally could write their company name and contact email. Including all sub-questions, it comprised of 79 unique variables. This meant it was a relatively large set of questions. As mentioned in the theory section as well as evident from the review of questionnaire it covers top management team processes, diversity items as well as other questions that would provide essential information about the location, financing and patents the company is associated with.

The survey team consisting of one PhD and three master-level students and the team was supervised by an experienced faculty professor. The author worked with, discussed and adjusted the survey for about 1.5 months to reach a version that was tested through couple of sample surveys tests. After these the survey was further adjusted and a cover email was formulated and a delivery mechanism was devised.

The survey questionnaire was hosted by an Internet based professional survey provider www.Checkmarket.com that was chosen after evaluating alternatives like www.Surveymonkey.com and www.Google.com . CheckMarket had fine-grained survey design and delivery options. In addition, one could define different sets of panelists and number of other options for conducting a survey in a professional way. The author designed an invitation email with the help of the Faculty head of Center of Entrepreneurship, University of Oslo. This cover email with his signature and the link to the survey were initially distributed through CheckMarket's own internal mail delivery system. Still for the new entries the survey was sent through direct email too. Whole exercise was professionally and neatly designed so that respondents take the matter seriously when deciding to respond and stay focused while answering questions (Mark Easterby-Smith 2008; Lussier 2011).

Without actually being conscious about this, the author can recall extra ordinary effort by one of the female members of this team in refining the esthetics of the survey, finding minor refinement possibilities, as well as being at forefront when communicating with the panelists for increasing response rate. While male members did also put extra effort in terms of

designing the survey questionnaire, evaluating the technical hosting alternatives as well as doing data collection activities for the team.
By this the author is pointing out that the work that went into survey idea, design, launch, data collection and then individual analysis could be a team performance study in the context of diversity. In this team there was gender, age, ethnic, educational and functional diversities.

3.4 Data Collection

Together with a team of researcher the author went for gathering survey data for this research. The data collection could be done through observation, but this would have required several observers to be present, something that would be time consuming, resource demanding and rather more suitable for focused case studies. As survey questionnaire was finalized, the data collection period was set from March to April 2011. The team of researcher assigned duties for data collection process for supporting respondents and for answering their queries.

The University faculty provided 146 unique email addresses with which the survey started on 4th March 2011. Soon it was discovered that that around 20 or so contacts were no longer functional because these people had left companies or those companies were no longer operational. To overcome this new contact information was found for these companies and for some companies were taken out of the survey panel. Meanwhile contact information regarding new companies emerged that got included in the panel. The response rate after couple of initial weeks was not significant and included some partial responses. The team started with telephonic contact with potential respondents and after some hard work, the response rate increased. The survey was ended on 14 April 2011 including the Easter holidays to achieve 56 unique responses out of 156 panelists - that includes 9 partial responses. As 8 emails still bounced the final panel was 148, so the response rate was around 38% . This is well above average of around 15 – 30% response rate for a medium complexity survey of 12 – 25, the survey that is reminded once (authors 2012) . The author expected that for Norway this average would be smaller. This definitely was a large survey with as many as 31questions where half of these could be termed as complex with many sub-questions. Looking the number in another way, out of those who saw the survey 65% responded.

3.5 Initial Analysis

By learning IBM SPSS day and night the author was able to do both data cleanup, transformation, basic and advanced analysis until there came a point where author's learning curve was getting almost flat, and the time was running out. This was when the author had to create a combined Sociobehavioral construct out of Q8 and Q9 without losing items as found through the Exploratory Factor Analysis (EFA), this was causing delays. The author learnt Structured Equation Modeling (SEM) and even started with Partial Least Square (PLS) modeling & statistical technique just few weeks before deadline of the thesis. With the advice from the advisor, the author turned back to and utilized regression for propositions testing. Complete log of most of the operations the author performed on the dataset is reordered and attached as reference in the Appendix. This proved to be a useful practice and is inline with the recommendation by many (Huck 2008; Field 2009; Esposito Vinzi 2010; Lussier 2011).

3.5.1 Cleaning and Making Data ready

The initial sample consisted of 56 unique responses for 31 main questions. With sub-questions, it consisted of 79 unique variables. After importing these from CheckMarket to SPSS number of cleaning operations were performed. These included applying 10 years rule for startups and taking out responses that were found to be coming from non-valid sources. Overall, 8 "precious" cases were taken out. This reduced the sample size to 48 unique responses including few with partial responses. A detailed log of efforts that went in to adjusting and operationalizing dataset is listed in the Appendix section.

3.5.2 Missing Data, Normality and Consistency

The author fond out later that missing data & normality issues are of important to resolve before using advance analysis techniques like factor analysis, regression, SEM, PLS etc. The missing data can occur for two main reasons – the respondents did not answer the question or the format of the questions was such that some questions were left unanswered. Multi-choice questions with many options may fall in this category - out of many alternatives respondents choose the ones they want. In the survey certain diversity question were structured this way.

Although the author spent extra effort in designing the survey such that most of the answers could be given by the click of a computer mouse, still there were few questions with the option of data entry. Nevertheless the extent of information the respondent were required to

understand and reflect upon situation and even numbers regarding themselves, top management team and their firm: This might have required them to focus more than they initially might anticipated. So for a long a complex survey like this one the missing values items issue will exist and it sure did. Still the percentage concerning main questions for missing response is well under 10% meaning that the missing data is of little importance if one focuses on the main factors. For Structural Equation Modeling analysis (SEM) this will pose an issue, therefore these cases will be selectively excluded when doing SEM.

When it comes to skewness and kurtosis, the most of the data is normal with a range around or under ±1. Few questions had distributions beyond ±1 due to outliers. These could be transformed or simply removed when required for example when doing SEM or PLS analysis.

3.6 Data analysis Method

The purpose of this study was to explore various top management team processes affecting their team's/ firm's performance (Richard, Devinney et al. 2009; Carpenter 2011). The author utilized IBM SPSS Descriptive Statistics and Graphs to highlight sample's main characteristics. In this way, the effectively of easier techniques for bringing forward important facts and relationship of a dataset is shown. Of course, by Microsoft Excel or even working out graphs by hand were feasible, but time-consuming alternatives.

For more advanced purposes, SPSS helped in terms of Factor Analysis, Correlation, and various forms of Regression analysis etc. IBM AMOS was used for Structural Equation Modeling (SEM) analysis while for Partial Least Square (PLS) techniques the author barely evaluated SmartPLS and WrapPLS (Esposito Vinzi 2010; Hair 2010; WrapPLS and SmartPLS 2012). A search could not find a way of doing PLS through IBM SPSS & AMOS.

3.6.1 Descriptive analysis

Descriptive analysis techniques are essential and quite powerful in providing an overview of survey data – frequency tables, sums, means, mode, standard deviation, missing values, skewness and kurtosis, graphs etc (Ho 2006; Field 2009; Lussier 2011). Out of many techniques, graphs are used largely in making sense of data set and communicating it to others – more on this in chapter 4. The descriptive analysis table with Questions, Minimum, Maximum, and Mean and Standard Deviation values can be found in the Appendix.

3.6.2 Factor Analysis

With the help of Exploratory Factor Analysis (EFA) techniques the component extraction method in SPSS is applied. Here follows a list of the resulting statistical values for construct items pertaining team process question Q 1 – Q9. The results include: Degree of Freedom (df), Standardized Cronbachs Alpha, Significance, Standardized PCA scores, Covariance, Chi Square and Kaiser-Meyer-Olkin (KMO) values.

Table 7 Team Process Questions & Exploratory Factor Analysis

Questions with important reliability parameters	PCA	% CoV	Chi_Sq	KMO
Q 1. Team Performance - df 3, Sig. 000, **α** =.821		73.1	46.8	.715
1.1 The amount of work the team produces	.861			
1.2 The quality of work the team produces	.837			
1.3 Your overall evaluation of the team's effectiveness	.865			
Q 2. Team Strategic Decision Speed - df 1, Sig. .030, **α** =.751 (initially two component emerged - to converge one sub questions taken out)		65.7	4.7	.500
2.1 We prefer and tend to take our time when making strategic decisions	.810			
2.2 We generally believe in making quick strategic decisions	.810			
2.3 Speed when planning or thinking about strategies (creating issues therefore taken out – reason complex textual formulation)				
Q 3. Multitasking/ Polychronicity - df 10, Sig. .000 , **α** =.813		66	122.7	.769
3.1 We believe people should try to do many things at the same time	.870			
3.2 We would rather focus on one project each day than on parts of several projects	.843			
3.3 We tend to juggle several activities at the same time	.674			
3.4 We think it is best and tend to complete one task before beginning another	.812			
3.5 We believe it is best for people to be given several tasks and projects to perform simultaneously	.850			
Q 4. Team Atmosphere - df 6, Sig. .000 , **α** =.921		80.1	138.2	.840
4.1 Team members feel inspired at work	.872			
4.2 Team members feel enthusiastic at work	.888			
4.3 Team members feel energetic at work	.942			
4.4 Team members feel excited at work	.894			
Q 5. Team and Entrepreneurial Orientation - df 10, Sig. .000 , **α** =.788		54.2	64.9	.723
5.1 In my team, people are very dynamic	.736			
5.2 In my team, innovation is emphasized above all	754			
5.3 In my team, people are willing to take risks	.675			

5.4 In my team, willingness to continuous progress is the joint foundation	.745			
5.5 In my team, people are eager at being always first to market	.768			
Q 6. Strategic Decision Comprehensiveness - df 10, Sig. .000 , **α** =.770		61.6	96.6	.752
6.1 …develop many alternative responses	.774			
6.2 ...consider many different criteria and issues when deciding the course of action to take	.667			
6.3 …thoroughly examine multiple explanations for the problem or opportunity	.795			
6.4 …conduct multiple examinations for the suggested course of action	.813			
6.5 …search extensively for possible responses	.863			
Q 7. Time Orientation and Rhythm - df 3, Sig. . 001, , **α =1**.387 (initially three component emerged, to converge two sub questions taken out)		53.5	16.804	.489
7.1 We believe our organization needs to learn from past experiences ((creating issues, past? - therefore taken out)	-			
7.2 The rhythm of work processes in our organization changes every week (creating issues, may be rhythm sounds abstract - therefore taken out)	-			
7.3 My organization can mobilize extra efforts on short notice	.844			
7.4 My working weeks are easily predictable (inversed)	.823			
7.5 Every hour somebody interrupt my planned work (weak)	.471			
7.6 Deadlines in my work are normally extremely strict (creating issues, stronger link to to another dimension therefore taken out)	-			
Q 8. Team Integration & Interpersonal Interaction - df 3, Sig. 000 , **α** =.699		62.8	24.560	.623
8.1 enjoy cultivating personal connections with each other	.688			
8.2 interact frequently outside the work place	.858			
8.3 interact with each other's family in various get-together activities	.821			
Q 9. Team Integration & Task-oriented Interaction-df 10, Sig .000, **α** =.860		64.8	103.636	.767
9.1 develop a large network of colleagues and associates at work they could call on for support when necessary.	.623			
9.2 are ready to help each other complete jobs and meet deadlines.	.853			
9.3 will defend each other promptly when facing external criticism.	.817			
9.4 proactively remind executives of potential problems and assist in resolving them.	.836			
9.5 will help me to achieve my goal through their successful experiences.	.871			

3.6.3 Correlations

In terms of method, one can do exploratory study with the help of bivariate correlations techniques to make a better sense of existing statistical relationships among constructs / variables under study.

With such an approach, the author has developed a table as attached in Appendix – Correlation Matrix. This was used for creating correlations overview and potential models. In addition, this gives an insight how closely related certain variables are to the other.
Important to note that model built here are just exploratory with indicative correlations and should go through regression or structural equation modeling for finding out the exact nature of statistical correlations.

3.6.4 Regression

Linear regression analysis will help find relationship between dependent variable (DV) and independent variable/s (IV). This determines which of the IVs are statistically significant with respect to matter in question. By using techniques to calculate the t-statistics for each of the independent variables and adjusted r-squared multivariate regression model is developed.

SPSS provides number of powerful regression alternatives and the techniques require time and effort to learn and interpret. The items to look for in regression results are listed in the Appendix and here follows a quick summary:
*$\mathbf{R^2}$, $\mathbf{R^2_{adj}}$ show model-fit and build upon Pearson r = 75 – 90 % very good, 0 – 25% poor
*** Standardized coefficients – β** (beta) gives regression coefficient for each IV variable "With all the other variables held constant"
* **F** shows the significance relationship significant and larger values are better
*** p** are significance of the relationship = good < 0.05 or better < .005 or best p < .001

Although regression in SPSS lacked graphical modeling option, it helped in building models as demonstrated in last part of chapter 4. The author faced number of challenges while using regressions when building a composite construct out of Q8 and Q9 that is known as Team's Sociobehavioral Integration (SBI). The goal was to model in a way such that participating constructs from Q8 and Q9 will be present together with SBI in the model. In this way both the collective and individual measures could be calculated. In other words while retaining Q8 which is TMT Interpersonal Interaction and Q9 which is Task-oriented interaction, the author

wanted to build a model where they as DV could be correlated to a multitude of IVs. This, in addition was suppose to help in building complex models where many diversity related variables could be included in the model. The purpose of this effort of course was studying the inter-relationship of the variables involved, still forming composite constructs out of such a model is what the author had in mind.

3.6.5 Structural Equation Modeling

(Schumacker and Lomax 2004; Kaplan 2009) Structural Equation Modeling (SEM) describes the relationships between observed variables, for providing a quantitative test of a hypothetical theoretical model developed by the researcher. The basic goal is to determine the extent to which the theoretical model is supported by the sample data.

In Structured Equation Modeling, there might be many possible models that fit the data at hand. However, the hypothesized models that are tested should be grounded in theory. The purpose is not to find the model that fits data best, but to test the theoretical model to see if it fits the data. Simplified, SEM can be viewed as a more advanced variant of path analyses, which makes it possible to estimate how the path coefficient would have been if the data was without measurement error. This technique has the advantage of explicitly considering the measurement error in the indicators and estimates a model with relevant values.

In terms of SEM application in IBM AMOS software a combined confirmatory factor analysis (CFA) and regression analysis could be there for structural equation modeling (SEM). This means the option of testing the fit of a hypnotized model including a) the relationship between the observed factors and the latent factors, and b) the relationship between the latent factors. A hypothesized model is specified using relevant theory and research, and then tested to see if the model fits the data. If the fit between the theoretical model and the data is not strong enough, the model can be modified, and then tested again. This is not unusual for initial models (Schumacker and Lomax 2004). SEM analysis is used just for exploratory and demonstrative purposes in this research and that it has great potential for complex diversity related analysis. Therefore, the explanation of model-fit and other relevant indices is moved to the Appendix.

3.6.6 PLS Technique - why did you come so late?

SEM will be more affected than regression will for small sample size analysis. For this research, there was a need to build a model comprising of large number of variables in the model and/or one that had complex inter-relationships among these variables. One of such model is depicted in section 2.4 that included all main diversity related variables in their multi-flavor: variety, disparity, and separation forms. This of course was challenging for existing small size data set in terms of model-fit indices and criteria discussed in the section on SEM. The second issue was constructs that resulted from the questionnaire – some of these proved not to be as rock solid as they should be.

While looking for solution, the author encountered Partial Least Square (PLS) technique in the last section of the book on Multivariate Analysis (Hair 2010). The main feature that is relevant for this research is its acclaimed effectiveness on small data sample and that it supports graphical modeling system. Upon search a way of doing PLS analysis through IBM SPSS or AMOS was not found, could be due to versions UiO had. After extensive search and recommendation on Internet, two excellent tools were found - SmartPLS and WrapPLS (Esposito Vinzi 2010; WrapPLS and SmartPLS 2012). The author did install and run these tools for sample analysis and find these to be interesting. Due to time constrains now these tools may be used for a similar research assignment in the future.

4. FINDINGS

In this chapter, the focus is on three main areas of findings:

- Descriptive Analysis by using Graphs
- Preparing for Propositions Testing
- Propositions Testing

The section will mainly focus on the statistical findings while theoretical references can be accessed in chapter 2. Discussions pertaining to research process and tools are spread across chapter 3 – 5 with a final discussion in chapter 5 containing recommendations for improvement and direction for future research.

4.1 Getting ready for the analysis

Finally, cleaned-up sample consisted of 48 leaders who had partially or completely answered 31 main questions. Together with sub-questions the total became 79 unique variables that was available for analysis. This means a total of 3,792 data entries. The missing values is 0% for most questions, under 10% for some and rather high for very few that is due to the design of those particular questions and possibly because this was a lengthy and complex questionnaire. The missing data is only of importance when doing certain diversity related statistics in this study. When it comes to skewness and kurtosis, the data was not normal. First at SEM and PLS analysis the outlier issues became evident, therefore removal of outlier data became essential. May be at data transformation stage, such type of data could have been removed.

In terms of consistency, means for the main Likert-scale questions are high, ranging from 4.3 to 2.09 on sub-question levels, still not a high range. The reason for a tendency of high mean may indicate that the respondents on average perceive themselves as better teams or worker than they really are. However, another and equally plausible explanation can be that the sample consists of very competent team worker. Nevertheless, another and equally plausible explanation can be that the sample consists of very competent team worker. These suggesting experienced or highly motivated teams, therefore their subjective evaluation may be an adequate representation of the reality.

4.2 Descriptive analysis by using Graphs

In figure 12 the number of males and females in the survey are drawn with respect to their age group. The sample had 7 females and 41 males while females are not represented in three extreme age groups of 18-23, 24-30 and 61 and over. The major age group is 41-50 followed by 31-40. This could be compared to studies from other countries

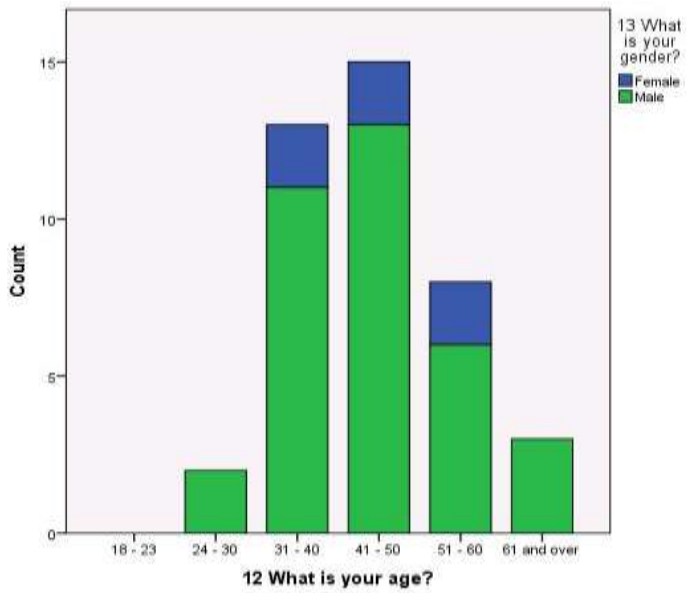

Figure 12 Age and Gender wise distribution of the survey respondents

In figure 13 on next page one can observe that most of the Startups in high-tech established in past 10 years had a TMT size in the vicinity of 3 – 4 and in the relevant table in Appendix the mean TMT size is 3.66 and a standard deviation of 1.53 which is not large. The exceptions to this are year 2007 and 2008 where TMT size was larger that is in the range of 5 – 6 and one guess can suggest that it may be due to economically good years – that is before the economical recession began in late 2008?

The green line indicates number of people working for the company and as known this measurement sometimes taken as an indirect performance indicator for a firm. As shown the number of people working for a firm fluctuated from 5 to almost 18. The mean from table in Appendix showed 8.92 and standard deviation was 12.80 that is a large number showing significant swings. In terms of the guess about 2007 and 2008 being good years the author observed that for the startups established in 2007 both the TMT size as well as number of people working for company were high while that changed drastically for 2008 where the

TMT number was high while the number of people working for newly established firm was small. The author can confirm this as he also established a company in 2007 and experienced good economical results while in 2008 the market began stagnating while 2009 was dead and 2010 like a wake up year. The author observed that number of people working for newly established firms was on rise in 2010. A

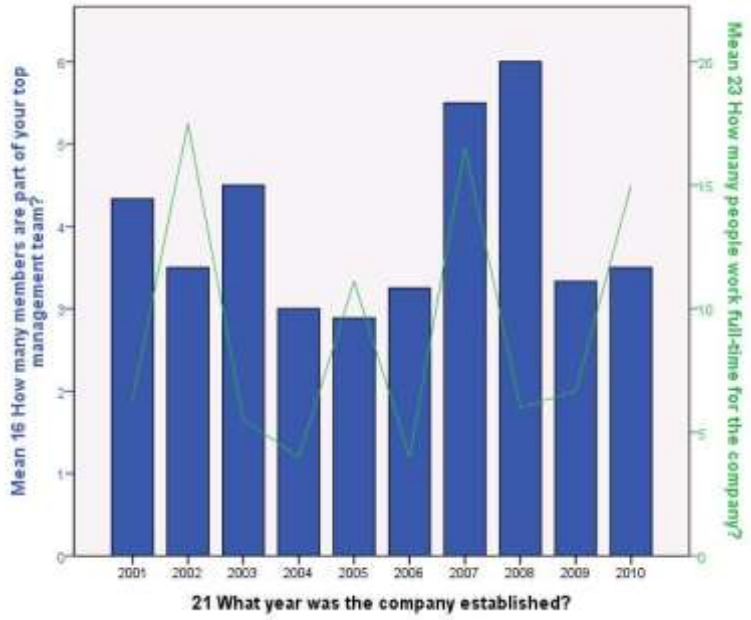

Figure 13 Company's year of establishing, No. of employees & TMT members

In figure as under the years the firm was established is replaced with type of industry the

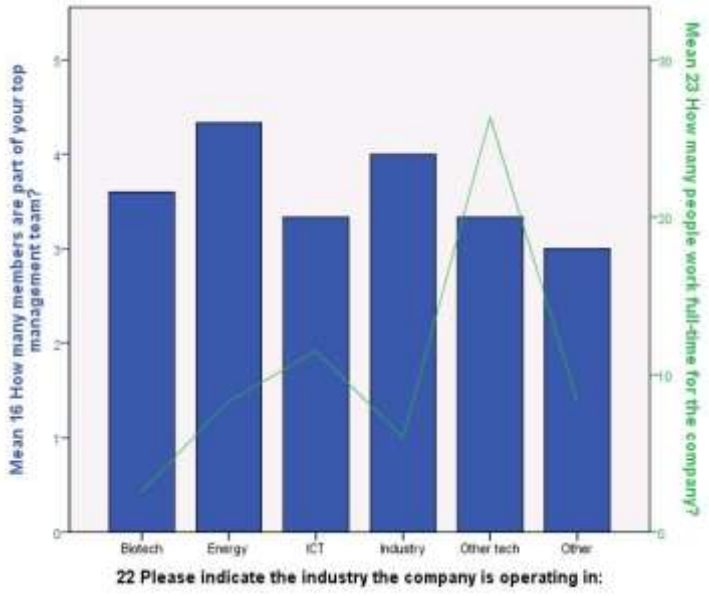

Figure 14 Industries, No. of employees and TMT members

firms were in, other two variable are the same as in figure 14. The TMT size seems almost the same for different industries while number of people working for these startups had a significant rise for indutry type ‘Other tech’ to which three firms in the sample belonged. A noticable rise for ‘ICT’ related firms is more of interest as 12 firms in the sample belonged to this industry. These could be further analyzed to find out why certain industry type had larger number of people working for them.

In the following figure, one can see the affects of patents a firm has applied-for to number of people working for the firm fulltime. This may provide us a clue on why firms in industry type ‘other tech’ have greater number of people working for them. Notice also that ICT related firms had almost zero patents which could be further analyzed in terms of what kind of research these firms relied upon – may be their R&D efforts if they had some was different than that of ‘other tech’? Out of this many more questions emerges like if this was a conscious choice and patents were avoided due to cost or if patents were seen unnecessary and a time consuming process or patents did not provide a competitive advantage to the firm etc?

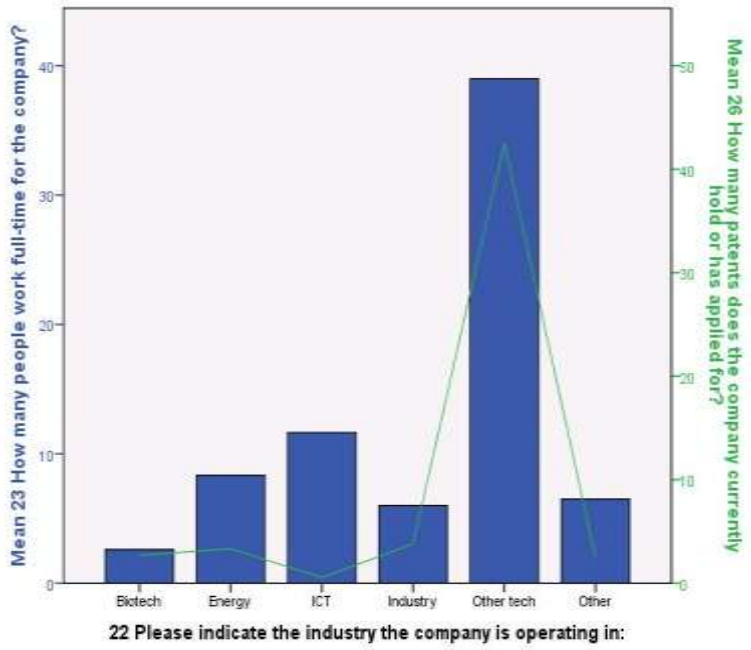

Figure 15 Industries, No. of employee & Patents a Company have

In figures 16 and 17 the relationship between financing these firms received and if it that had an affect on number of the full time employee is explored. ‘Other tech’ can be further analyzed as it is showing significant firm size with and without seed financing. While for ICT firms the size seem to have a negative relationship with respect to seed financing, interesting?

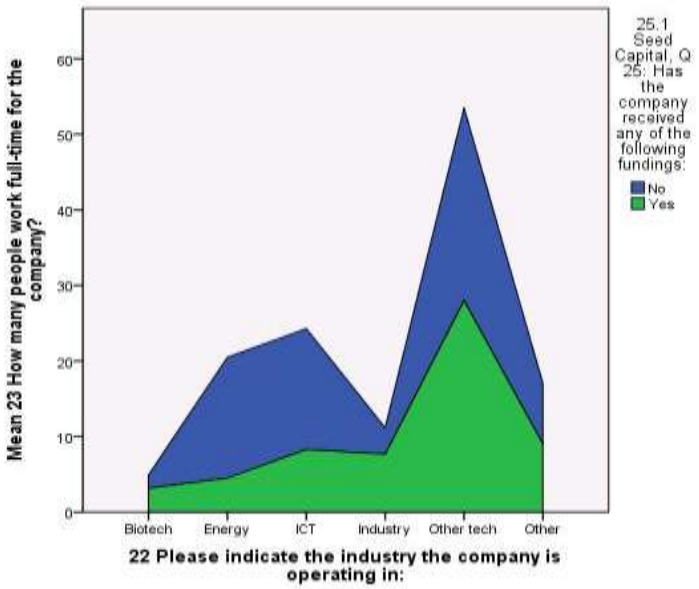

Figure 16 Industries, No. of employees & if Seed Capital acquired

In fig. 17, one can see the incubator or science park based firms did better than those not there. This is to be observed that smaller firms were in incubator or science parks and that could further mean that have preferred being in a technology/ science park or university incubator. One research question emerging here is how long these startup remained in these facilities?

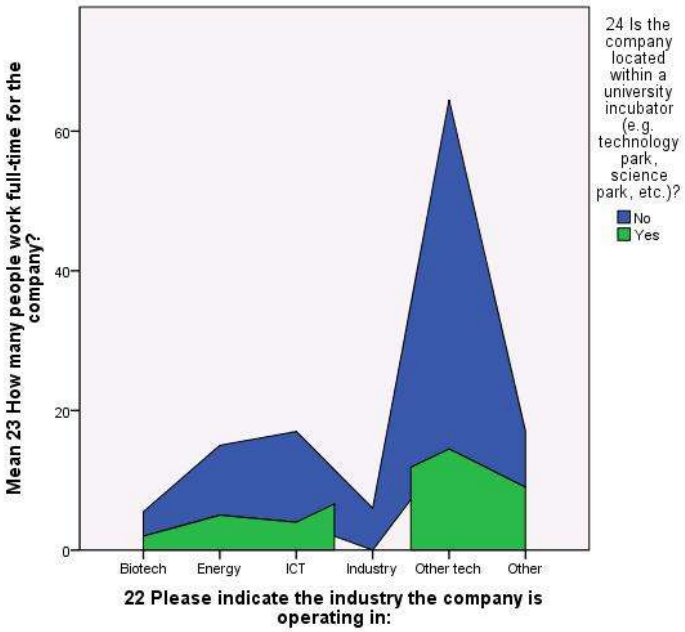

Figure 17 Industries, No. of employees & if it is a technology park or alike firm

Here in figure 18 & 19 one can see the effect of CEO's ownership and if that had an affect on TMT size or number of full time employees these firms had – both with respect to the industries these firms belonged to.

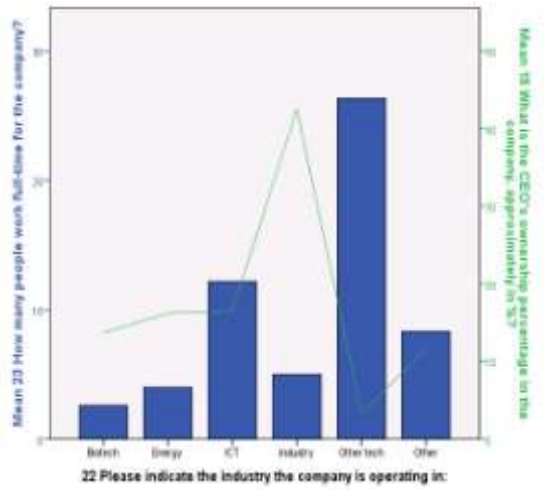

Figure 18 Industries, No. of FT employees and CEO's ownership

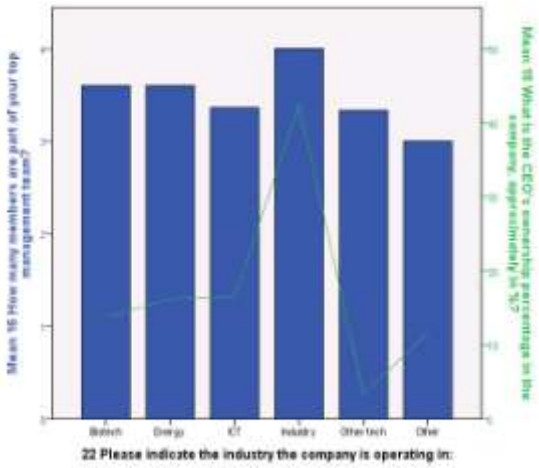

Figure 19 Industries, No. of TMT members and CEO's ownership

The 3-D kind of model as under explore the effects of Seed and Venture financing with respect to number of full-time employees these firms had. A negative relationship is shown which not necessarily mean it is a negative relationship – this can be further analyze to find out how old the companies were.

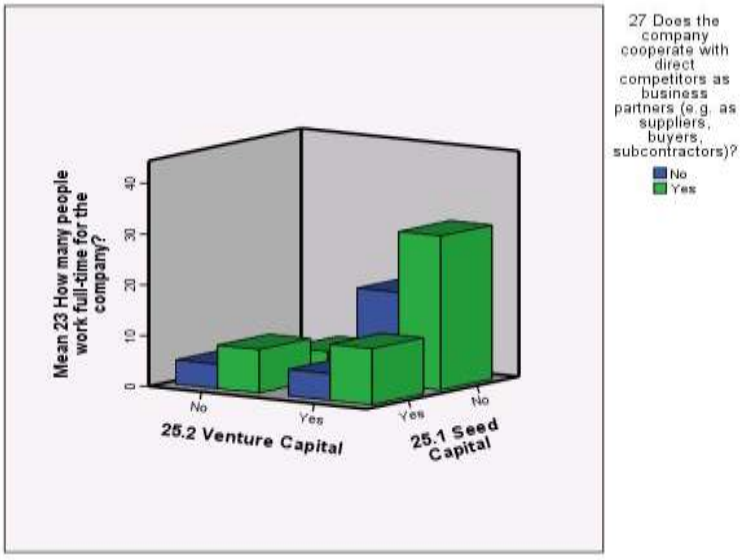

Figure 20 No. of FT employees and if Seed and/ or Venture Capital acquired

In the following figure, number of full-time employees in relation with Seed financing and different industry types the sample represented. At first glance it look like seed financing meant smaller firm size, still this is not a conclusive argument because there could be a difference in terms of old and new firms.

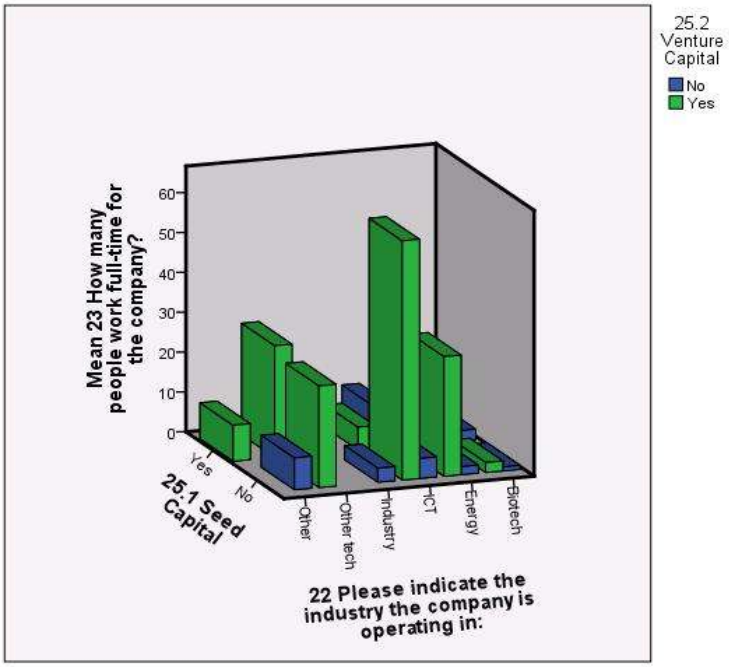

Figure 21 Industries, No. of FT employees and if Seed and/ or Venture Capital acquired

4.3 Testing Propositions

4.3.1 Sociobehavioral Integration variable

In the section 2.3.3 the Sociobehavioral Integration (SBI) is briefly defined. The concept is operationalized through three items for interpersonal interaction in Q8 and five items for task-oriented interaction in Q9 thus resulting two IVs. Now building on the literature review (Simsek 2005; Chen, Lin et al. 2010; Chen 2012), statistically a collective measure capturing the degree of team's SBI is created. This will measure the team readiness to tackle the challenges faced by a startup as highlighted in section 2.1.2 – 4. In essence, a higher SBI will help in maximizing competitive human advantage both in short and long terms. As mentioned previously human skills and characteristics are essential building blocks of Upper-Echelon, Resource Based View and Competitive Advantage theories, therefore SBI is fundamental for propositions testing procedure as well as for understanding the larger picture.

The aggregation of Q8 and Q9 is achieved through factor extraction and principal component analysis (PCA) techniques. Varimax rotation method with Kaiser Normalization is utilized. With reference to following table the 6-item SBI factor will be used in further analysis work.

Table 8 SBI construct's validity measures

Different measures of Adequacy		**Based on 7 Items from Q8 and Q9**	**Based on 6 Items from Q8 and Q9 (taking out Q 8.3)**
Number of Components Extracted		2	1
Initial Eigenvalues and Capturing % of Variance		4,1 & 50,1% 1,4 & 17,6%	3,9 & 55,4%
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,786	,819
Bartlett's Test of Sphericity	Approx. Chi-Square	159,633	134,022
	df	28	21
	Sig.	,000	,000

4.3.2 All Variables of Interest

Here follows a table that summarizes means, standard deviations, and correlations among variables of interest. To save space and increase the readability only variables of interest are included, a complete list can be found in the Appendix section. This table provides some

initial evidence of discriminant validity and permits the interested reader to have an overview of the covariance matrix. This will be indicative in propositions testing where one-, two-, and three, four-factor model structures are utilized and chi-square difference tests is also used.

Table 9 Means, Standard Deviations, and Correlations Table

Variables	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.Performace	3,9	,7														
2.Socio-beh. Int.	3,3	1,0	,51***													
3.Decision Speed	2,9	1,0	-,04	-,03												
4.Polychronocity	3,2	1,1	,02	,02	,28											
5.Entr.Orinetation	3,8	,8	,40**	,61***	,25	,25										
6.Decision Comp.	3,5	,9	,22	,26	-,18	,07	,35*									
7.InterPersonal	2,7	1,1	,38*	,64***	,08	-,03	,29	-,07								
8.TaskOriented	3,9	,9	,50**	,98***	-,07	,03	,62***	,30*	,50***							
9.CEO Age	3,9	1,0	-,03	-,25	,02	-,31*	-,18	,00	-,17	-,25						
10.CEO Gender	,9	,4	-,24	-,07	-,03	-,08	-,28	-.33*	,19	-,12	-,03					
11.TMT Members	3,7	1,5	-,25	-,22	-,18	-,02	-,02	,03	-,10	-,22	-,24	,00				
12.Education Blau	,4	,2	-,20	-,07	-,24	-,16	-,15	-,07	-,13	-,02	,13	,01	-,02			
13.Function Blau	,7	,2	,13	,20	-,10	,17	,14	-,22	,30	,16	-,35*	-,08	,15	-,22		
14.FT Employees	8,9	12,8	-,03	-,03	-,29	,07	-,08	-,19	-,04	,02	-,17	,06	,13	,14	,22	
15.Company Age	6,1	2,6	-,10	-,13	-,12	-,10	-,20	-,03	-,24	-,07	,20	,29	,07	,32*	-,20	,00

n = 48 – 39 (pairwise)

Correlation (2-tailed) is significant at the level:
* p = < 0,05
** p = < 0,01
*** p = < 0,001

4.3.3 Regression for Propositions Testing

For interpreting regression tables and important values in them a short guideline is presented in the Appendix. In the following section when propositions are tested using regression the common outcome like one below will only appear if the values are significant and/or not normal. The values pertaining multicollinearity, VIF and tolerance suggest that the unique contribution of each variable is well identifiable and is not overlapping or shared with others. R Square (R^2) is measure of the correlation indicates the proportion of the variance in the criterion variable which is accounted for by this model. The beta (β) value is standardized regression coefficients measuring how strongly each predictor variable influences the criterion variable. The F value from ANOVA table shows that the regressions models fits the data. With F-ratio the degree of freedom (df) for the variable and residuals is also reported.

4.3.4 Proposition 1 - SBI as Performance measure

Theoretically Socio-behavioral Integration (SBI) construct can be utilized as a Performance measure (Simsek 2005; Chen, Lin et al. 2010; Chen 2012). The correlation table indicates that SBI and perceived performance have a very strong correlation that is 0,51 & $p < 0,001$. To investigate this further Multiple Linear Regression with factor Q1 perceived performance as dependent variable I run. To differentiate two independent variable both Factor Q8 & 9 Sociobehavioral Integration and Q23 Total number of fulltime employee are used. The results as presented in the Appendix Regression section and can be summarized here as:

Model 1: Correlation between DV Performance and IV SBI.

Strength of the model: $R^2 = .264$, Adj. $R^2 = .244$, $\Delta R^2 = .264$, $F(1, 37) = 13.29$, $p < .001$

Independent Relationship: $\beta = .514$, $t = 3.65$, $p < .001$

Model 2: Correlation between DV Performance and IVs SBI and No. of Full Time Employees

Strength of the model: $R^2 = .264$, Adj. $R^2 = .224$, $\Delta R^2 = .00$, $F(2, 36) = 6.47$, $p < .004$

Independent Relationship (SBI) $\beta = .514$, $t = 3.59$, $p < .001$

Independent Relationship (FT Employees) $\beta = -.010$, $t = -.073$, $p < .942$

The result shows that Model 1 accounted for 26.4% of the variance (R^2) of the depended variable, though poor still acceptable. By observing the value of 'F', 'p' & 't' one can conclude that entry of SBI alone in the model 1 yielded a significant prediction equation. The value of Beta (β) explains that SBI alone contribute 51.4% to the model, this large value indicates that a unit change in IV (predictor) has a large effect on the DV (criterion). The proposition that suggests SBI and Performance are correlated is retained.

Model 2 in one way confirm model 1, but also show that the inclusion of fulltime employee variable is not suitable for this model. This is evident as value of 'F' got halved, value of R^2 degraded and independent correlation show results far from significant. Thus, the number of full time employee did not have a significant effect on performance alone or when added with SBI. So if a proposition suggesting positive correlation between Performance and number of full time employees in the company existed, that would have been rejected on the basis of these results.

Proposition 1 Supported *such that Sociobehavioral Integration (SBI) will contribute significantly positive to the Team Performance, thus will be used as Performance measure.*

4.3.5 Proposition 2 - EO as a measure of Team Performance

Building correlation matrix and P1, a multi regression is run to establish the degree of relationship between EO and Performance for this survey. This sure is well grounded on the EO topic discussion in the theory section (Dess and Robinson 1984; Lumpkin and Dess 1996). In addition to these two factors, SBI is included with an intention to form a model between these three performance related variables.

The results as presented in the Appendix Regression section and can be summarized here as:

a. DV Performance and IV EO

Strength of the model: R2= .375, Adj. R^2= .360, ΔR^2= .375, F (1,41) = 24.62, p < .001

Independent Relationship (EO) β = .394, t = 2.84, p < .001

b. Model 1: DV Performance and IVs EO, SBI

Strength of the model: R^2 = .155, Adj. R^2 = .135, ΔR^2= .155, F(1, 41)= 7.54, p < .009

Independent Relationship (EO) β = .155, t = 2.75, p < .009

b. Model 2: DV Performance and IVs EO, SBI

Strength of the model: R^2 = .274, Adj. R^2 = .238, ΔR^2= .119, F(2, 40)= 7.56, p < .002

Independent Relationship (EO) β = .127, t = .74, p < .46

Independent Relationship (SBI) β = .436, t = 2.56, p < .014

c. DV SBI and IV EO

Strength of the model: R^2 = .375, Adj. R^2 = .360, ΔR^2= .375, F(1, 41)= 24.62, p < .004

Independent Relationship (EO) β = .612, t = 4.96, p < .001

For the correlation between Performance and EO as in regression variation 'a' it can be established that null proposition is rejected. Moreover it predicts that EO can explain 39.4% of the variance in perceived performance and results are very significant.

By analyzing F value from ANOVA tables it suggest that although the various regressions models fits the data, still simplified models 'a' & 'c' are better than the model 'b'. Thus as performance measure it will useful to use either EO or SBI, separately. Moreover, the correlation between SBI and EO is under .7 so they best be retained as separate factors.

Proposition 2 Supported *such that Entrepreneurial Orientation (EO) will contribute significantly positive to the Team Performance, thus will be used as Performance measure.*

4.3.6 Proposition 3 – Effect of Decision Making & Polychronicity on EO

Building on the theories of entrepreneurial orientation (EO), decision making-speed (DS), decision-making comprehensiveness (DC) and Polychronicity (PC) or multitasking a multi regression is executed.

Model 1: DV EO and IVs DC

Strength of the model: $R^2 = .122$, Adj. $R^2 = .103$, $\Delta R^2 = .122$, $F(1, 44) = 6.14$, $p < .017$

Independent Relationship 1 (DC) $\beta = .350$, $t = 2.48$, $p < .017$

Model 2: DV EO and IVs DC, DS

Strength of the model: $R^2 = .227$, Adj. $R^2 = .191$, $\Delta R^2 = .104$, $F(2, 43) = 6.30$, $p < .004$

Independent Relationship (DC) $\beta = .409$, $t = 3.00$, $p < .004$

Independent Relationship (DS) $\beta = .328$, $t = 2.41$, $p < .021$

Model 3: DV EO and IVs DC, DS, PC

Strength of the model: $R^2 = .245$, Adj. $R^2 = .191$, $\Delta R^2 = .018$, $F(3, 42) = 4.53$, $p < .008$

Independent Relationship (DC) $\beta = .391$, $t = 2.85$, $p < .007$

Independent Relationship (DS) $\beta = .285$, $t = 2.00$, $p < .052$

Independent Relationship (PC) $\beta = .141$, $t = 1.00$, $p < .321$

The analysis of results reveals that although the various regressions models fits the data, still models 2 has strongest values in terms of F, R Square and significance of the model. The decision-making comprehensiveness contributes 12.2% to EO while with the addition of decision-making speed this contribution approaches 22.7%. In addition, the significance level increases substantially. The Polychronicity (PC) or Multitasking (MT) is not significantly effecting as shown in the model 3. The simple regression on MT as IV and EO as DV did improve some values, but the results remained non-significant. The simple run of regression on MT as IV and Performance as DV showed that MT still was non-significant. Just for the sake of curiosity, replacing EO with SBI did not achieve significant results for Multitasking.

Proposition 3a Supported *such that Faster Decision Making Speed (DS) will result in stronger Entrepreneurial Orientation (EO) and consequently better Team Performance.*

Proposition 3b Supported *such that better Decision Making Comprehensiveness (DC) will result in stronger Entrepreneurial Orientation (EO) and consequently better Team Performance.*

Proposition 3c Rejected *such that Polychronicity /Multitasking will not contribute significantly to Entrepreneurial Orientation (EO), SBI nor to the Team Performance.*

4.3.7 Proposition 4 – Effect of Various Diversities on EO

I run multi regression to this compound proposition that Age has negative relationship with Entrepreneurial Orientation (EO) while Gender, Educational and Functional diversities have positively influence on EO. To be exact the variety type of diversity is being tested here, more details on variety are to be found in the chapter 2. For variety measure of educational and functional diversities the Blau indices will be utilized. Here follows the result.

Model 1: DV EO and IVs CEO's Gender

Strength of the model: $R^2 = .079$, Adj. $R^2 = .056$, $\Delta R^2 = .079$, $F(1, 39) = 3.36$, $p < .074$

Independent Relationship 1 (Gender) $\beta = -.282$, $t = -1.83$, $p < .074$

Model 2: DV EO and Leader's Gender, Leader's Age

Strength of the model: $R^2 = .115$, Adj. $R^2 = .069$, $\Delta R^2 = .036$, $F(2,38) = 2.47$, $p < .098$

Independent Relationship (Gender) $\beta = -.287$, $t = -1.88$, $p < .067$

Independent Relationship (Age) $\beta = -.189$, $t = -1.24$, $p < .223$

Model 3: DV EO and Leader's Gender, Leader's Age, Blau Index for Team's Educational div

Strength of the model: $R^2 = .131$, Adj. $R^2 = .061$, $\Delta R^2 = .016$, $F(3,37) = 1.87$, $p < .152$

Independent Relationship (Gender) $\beta = -.285$, $t = -1.86$, $p < .071$

Independent Relationship (Age) $\beta = -.173$, $t = -1.12$, $p < .271$

Independent Relationship (Blau Edu.) $\beta = -.129$, $t = -.833$, $p < .410$

Model 4: DV EO and IVs DC, DS, PC

Strength of the model: $R^2 = .132$, Adj. $R^2 = .036$, $\Delta R^2 = .001$, $F(4, 36) = 1.37$, $p < .262$

Independent Relationship (Gender) $\beta = -.282$, $t = -1.81$, $p < .079$

Independent Relationship (Age) $\beta = -.161$, $t = -.97$, $p < .340$

Independent Relationship (Blau Edu.) $\beta = -.123$, $t = -.771$, $p < .446$

Independent Relationship (Blau Func.) $\beta = .034$, $t = .842$, $p < .142$

By analysis of the values it reveals that none of the IVs have acceptable significance. The values for F & R Square are unacceptably low making all the models non-fit. The gender diversity (variety) variable had significance just above 0.05 and its model fit is not up to the mark. In short, the values in the result did not support the proposition.

Proposition 4a Rejected *such that there not enough evidence that Age has negative and Gender has positive influence on Entrepreneurial Orientation (EO).*

Proposition 4b Rejected *such that there is not enough evidence that "variety" type of Educational and Functional diversities have positively associated with Entrepreneurial Orientation (EO).*

4.3.8 Proposition 5 – Effect of Age & Gender Diversities on Decision Making Comprehensiveness (DC)

Here follows multi-regression results to investigate this proposition that suggest growing age will mean comprehensive decision and female leader will comparatively make more comprehensive decisions.

Model 1: DV DC and IVs CEO's Gender

Strength of the model: $R^2 = .108$, Adj. $R^2 = .086$, $\Delta R^2 = .108$, $F(1,39) = 4.74$, $p < .036$

Independent Relationship 1 (Gender) $\beta = -.329$, $t = -2.18$, $p < .036$

Model 2: DV DC and Leader's Gender, Leader's Age

Strength of the model: $R^2 = .109$, Adj. $R^2 = .062$, $\Delta R^2 = .000$, $F(2,38) = 2.32$, $p < .112$

Independent Relationship (Gender) $\beta = -.330$, $t = -2.15$, $p < .038$

Independent Relationship (Age) $\beta = -.015$, $t = -.095$, $p < .925$

The results show that the Age variable does not have a significant impact on decision making comprehensiveness (DC) while Gender does have a negatively significant impact on DC around 33%. As Males are code as '1' and females as '0' a negative β translates to that males and comprehensive decision making is by a factor of 33% are negatively correlated.

Proposition 5a Supported *such that the Gender Diversity (variety)of the type male has negative correlation with Decision Making* Comprehensiveness *(DC), in a weak model.*
Proposition 5b Rejected *such that there is not enough evidence that Age diversity has positive influence Decision Making* Comprehensiveness *(DC), though in a weak model.*

4.4 Measurement Scale, Validity and Reliability

After the propositions study or testing a retrospective overview seems necessary in terms of validity and reliability of constructs used and results achieved. This is kind of auditing for the research conducted and covers a broad range of areas concerning research process. It starts from looking in to what one intends to investigate in a particular research and then all the important choices that are made. From short-listing the variables and constructs, measurement scales, survey design - from language & delivery to data collection, analysis techniques, checking for biases - abnormality and outliers etc. Which results are significant and what to regards and what to disregard and on which criteria, model building and interpretation of the results (Mark Easterby-Smith 2008; Lussier 2011; Huck 2012). All this may sound like a extreme sport of its kind and is not recommended for people with a "weak heart".

4.4.1 Measurement Scale Analysis

The measurement scale is already discussed in somewhat detail in section 3.1.2 and as per say most the variables used in the survey were of ratio/interval scale, thus making the measurements statistically strong. Moreover these made possible use of Parametric tests which are regarded more authentic and reliable (Lussier 2011; Huck 2012). Some of the diversity measures are exception to this as they carried either ordinal or nominal measurement scales. Some of these could be avoided as if the question of diversity preference could be based on Likert scale of 1 - 7 rather than having an ordinal preference of 1, 2, 3. Some team related diversity variables were transformed to interval/ ratio scale, thus making them statistically stronger and more usable in analysis with variables of same measurement scale. This applies particularly to the transformation of gender variable to a dummy one. For team's educational and functional diversities though it took time to find a transformation or operationalization mechanism, still when found these elegantly resulted in a set of indices describing disparity, separation, and variety type of diversities.
The following table as a nice reference and can be of great help in the survey design process. Note that in SPSS the Interval and Ratio scales are termed as "Scale" measures.

Table 10 Level of Measurement - adapted from (Lussier 2011)

Measurement Level	**Mutually Exclusive & Exhaustive (Categories)**	**Categories can be ranked (order >)**	**Standard unit measurement (fixed interval)**	**Meaning-full zero point (0)**	**Number arbitrarily Assigned (values)**	**Statistics to test Propositions (metric)**
Nominal	yes				yes	Non-parametric Chi-Square
Ordinal	yes	yes			yes	Non-parametric Wilcoxon, Mann-Whitney, Friedmans, Kruskal-Wallis)
Interval	yes	yes	yes		no yes - rating	Parametric ANOVA
Ratio	yes	yes	yes	yes	no	

4.4.2 Validity Analysis

The validity analysis can be organized in many ways like internal and external; still the structure presented in the reference table below is a more effective way for this analysis. Out of the three main areas presented, the focus will be on content and construct validity in this exploratory research.

Table 11 Summary of Validity adapted from (Lussier 2011)

Type of Validity	**What is measured**	**Measurement Methods*/ Statistical test**
Content	The extent to which it provides adequate coverage of the variable.	Literature/ panel of experts/ content validity ratio
Criterion Concurrent Predictive	Its correlation scores with other established measurement scores. -Current and at the same time as criterion measure -Forecast a future value with criterion measure	Correlation/ test of difference & regression
Construct Convergent Discriminant Factor	Assesses the theory and the measurement instrument -Similar to concurrent with non-observable traits, multi-measure. -Test known groups that do and don't possess trait of differences. -Test the correlation of items with variable factors	Correlation Correlations/ Test of difference Discriminant analysis Factor analysis

*Note that all measures should be based on the literature

Content validity

This measures the extent to which the questions in a test are representative of the trait, behavior, or attribute that is being measured. Content validity is termed as simple test and there are no formal statistical measures, thus conducted in a qualitative fashion. This could be done systematically by defining the testing domains or the areas with boundaries set and then getting expert ratings. The content validity ratios can then calculated for the questions which are the proportion of experts who term that question is essential. A question is usually described as content valid when half of the experts suggest it essential. The literature can be instrumental in comparing domain, boundaries, language, formulation and ratios from the research content with the established research.

In the survey design for this research, the author has relied both on the literature and in running multiple qualitative content validity tests. Six researchers took part in the content validity exercise. This is of course in addition to the fact that for most of the measurement instruments and set of questions in the survey had strong literature foundation. With the help of researcher team, test surveys were run to adjust the language, sequence, presentation etc. On most of the questions, there was full agreement that these remain part of the survey. There were couple of questions pertaining diversity where researcher had a discussion whether to include these part of the survey. The agreement became "yes" these be part of the survey, still these neither will be obligatory for the survey nor essential for the analysis conducted. Their purpose was more of exploratory nature and these were termed as exercise for future surveys. Even after this rigorous exercise it was found that some items in the "Q7 Time Orientation and Rhythm" seem to have confused respondents. This suggesting the betterment of survey items is a continuous process and due to time and resource constrains one will never have an ideal set of questions.

Face validity refers to how test takers perceive the attractiveness and appropriateness of a test. If test takers consider the test to have face validity, they may offer a more conscientious effort to complete the test. If a test does not have face validity they might hurry through a test and take it less seriously. **For these survey questions the face validity though acceptable**, still could be improved substantially. To increase the response rate for this combined survey the team of researchers had to make contact with potential respondent to motivate them answer the survey. This made the majority of those who saw the survey respond and by these measures 64% of those who saw it responded. In addition, out of 56 initial responses there were around 15% who did not complete the survey fully. All this suggesting there are areas of improvement especially the fact that it was a long and complex survey with 31 main questions containing 79 items or sub-questions covering a breadth of areas. The language was English instead of local Norwegian language. There were no incentives other than the respondents were helping research in the field.

Construct validity

The main purpose of this type of validity is to test the question whether the variables measures what it sets out to measure and threats to this proposition could be:

• Propositions/ hypotheses guessing, which happens if the respondents in the sample group try to guess the purpose of the study, and that they act atypically because of this.

• Evaluation apprehension, which happens when apprehension about being evaluated results in respondents in a survey trying to depict themselves as more competent than they are.

Both threats could be present in the study because it was not difficult to guess what this survey wanted to measure – what goes in to making a top management team performs better? The question id if this right guessing could have biased the answers of respondents is open for discussion. The point is if they had decided to answer the survey and were well aware of what the researchers are looking then this may have contributed to quality answers. **Convergent validity** is the degree to which the scale that should be related theoretically with other attributes or variables is interrelated with them in reality.

Discriminant validity is the degree to which the scale that should not be related theoretically with other attributes or variables are, in fact, not interrelated in reality.

Convergent and discriminant validity are important subcategories of construct validity. The important thing to recognize is that they work together. Not just one of these alone is sufficient for establishing construct validity.

Statistically, the constructs used in the survey demonstrated both of these validities through number of tests for example through exploratory factor extraction (EFA) using Principal Component method. The extracted variance was in most cases above .70 making these good validity test (Ho 2006; Hair 2010).

Internal validity is the extent to which one can infer that a causal relationship exists between two or more variables (Grimm and Yarnold 2000; Huck 2008) . As known Pearson's correlation coefficient can not determine this kind of cause-and-effect relationships, and in SEM it is the amount of influence rather than a cause-and-effect that is assumed and interpreted. The necessary conditions for determining such causal relationships are:

- Temporal order (X precedes Y in time)
- Existence of covariance or correlation between X and Y
- Control for other causes

For this temporal order is the same as all the variables are measured the same time and the author is not relying on external data to proxy for performance. Initial analysis suggested that there existed covariance or correlations between X & Y which affected factors involved, model building and interpretation of the results. Other causes like threat of history and maturation to internal validity will sure be there. Though all participants are in the same large macro environment, their background, maturity level etc differed – some of these variation were measured through diversity related variables.

External validity asks whether the findings from this study can be generalized to other External validity can be seen as a function of the general similarity between the survey and the goal that the generalization is aimed for. The target population for the study is top management teams in high-tech startups. So a generalization in this context will be fair, though some feature could be generalized to all organizations (Grimm and Yarnold 2000; Huck 2008; Lussier 2011).

4.4.3 Reliability Analysis

The reliability tests calculate a number of commonly used measures of scale reliability and provides information about the relationships between individual items in the scale. In other word the measurement scale discussion in section 4.4.1 is part if reliability analysis.

Table 12 Summary of Reliability adapted from (Lussier 2011)

Type of Reliability	**What is measured**	**Measurement Methods/ Statistical test**
Stability Test-restet Test Administrator	Variability of scores by correlations of the repreated measurement instrument itself and *measurer* at two points in time. -with same measurement instruments & participants -with *same measurer* and & participants	Correlation
Equivalence Parallel forms Interrater	Variability in parallel forms of the measurement instrument & multiple measures. -with multiple m. instruments measure same thing to determine its equivalence at one point in time -when multiple raters score same participants same time and comparing individual to the group scores	 Correlation Percentage/ Correlation
Internal Consistency Split-half Alpha Dichotomous Alpha	Variability within the measurement instrument among items. -between the odd and even (random) item scores of a test at the same time -Correlations of multiple items factors/ variable to measure if they are measuring the same thing -Estimates a coefficient for right/ wrong scoring	Correlation formula: Spearman-Brown Cronbach Kuder-Richardson
Intraclass	Variability test by not using correlation coefficient	Test of Difference

Cronbachs Alpha reliability coefficient is traditionally reported as the measure of the inter-correlations between the indicators of the underlying construct. As listed in factor extraction table Cronbachs Alpha for eight out of nine constructs were calculated those range from 0.699 for Q 8. Team Integration & Interpersonal Interaction to 0.921 for Q4. Team Atmosphere or Cohesion or Trust indicating acceptable reliability and internal consistency. As factor for Q7. Time Orientation and Rhythm was not extracted properly based on the 5-item sub-questions, therefore this variable was disregarded - abnormally high Cronbachs Alpha reading of 1,39. The intension to build composite diversity constructs on the basis of sound theory, through structural equation modeling (SEM) required more effort. Until then the idea was to explorer and test diversity measures using disparity, separation and variety. SEM actually provides quite advanced reliability indices which offer pointer towards the solution in terms of which of these latent variables do work or not in the model.

Reliability scores were further computed and were all in line with generally supported standards of good reliability that is > .70, as shown in the table given in the section on factor analysis. For newer research like that of diversity lower values could also be acceptable.

4.5 Model a "Bigger Picture"

For theory building modeling techniques can help for describing the entire structure of linkages between dependent and independent variables that are being studied. For initial explorative study one can use correlation matrix between variables to build a model, still such a model will not be statistically authentic picture as it will only be presenting one to one relationship between variables. Regression variation like multi-regression and other statistical techniques like Structural Equation or Modeling (SEM), or Path-Least Square (PL) will be more suitable in building one to many or many to many relationship models between variables.

4.5.1 Path Analysis Using Regression

Based on causal theory, the multi regression analysis that was instrumental in propositions testing will also help in building a path analysis model. The aim is to describe the entire structure of relationship or linkages between IVs and DVs. Although a "Forward" regression method is recommended, to save time and space, existing regression analysis with "Enter"

method is utilized. It is separately verified that the forward method yield more or less same results as this model has just few variables and not all of these are heavily inter-linked.

Recalling from testing propositions, the ones that are supported will help in building a model:

P1 - Model 1: Correlation between DV Performance and IV SBI.
Strength of the model: R2= .264, Adj. R2= .244, $\Delta R2 = .264$, $F(1, 37) = 13.29$, $p < .001$
Independent Relationship: $\beta = .514$, $t = 3.65$, $p < .001$

P2 - Model 2: DV Performance and IVs EO, SBI

Strength of the model: $R^2 = .274$, Adj. $R^2 = .238$, $\Delta R^2 = .119$, $F(2, 40) = 7.56$, $p < .002$
Independent Relationship (EO) $\beta = .127$, $t = .74$, $p < .46$
Independent Relationship (SBI) $\beta = .436$, $t = 2.56$, $p < .014$

P3a/ P3b - Model 2: DV EO and IVs DC, DS

Strength of the model: $R^2 = .227$, Adj. $R^2 = .191$, $\Delta R^2 = .104$, $F(2, 43) = 6.30$, $p < .004$
Independent Relationship (DC) $\beta = .409$, $t = 3.00$, $p < .004$
Independent Relationship (DS) $\beta = .328$, $t = 2.41$, $p < .021$

P5a - Model 1: DV DC and IVs CEO's Gender

Strength of the model: $R^2 = .108$, Adj. $R^2 = .086$, $\Delta R^2 = .108$, $F(1,39) = 4.74$, $p < .036$
Independent Relationship 1 (Gender) $\beta = -.329$, $t = -2.18$, $p < .036$

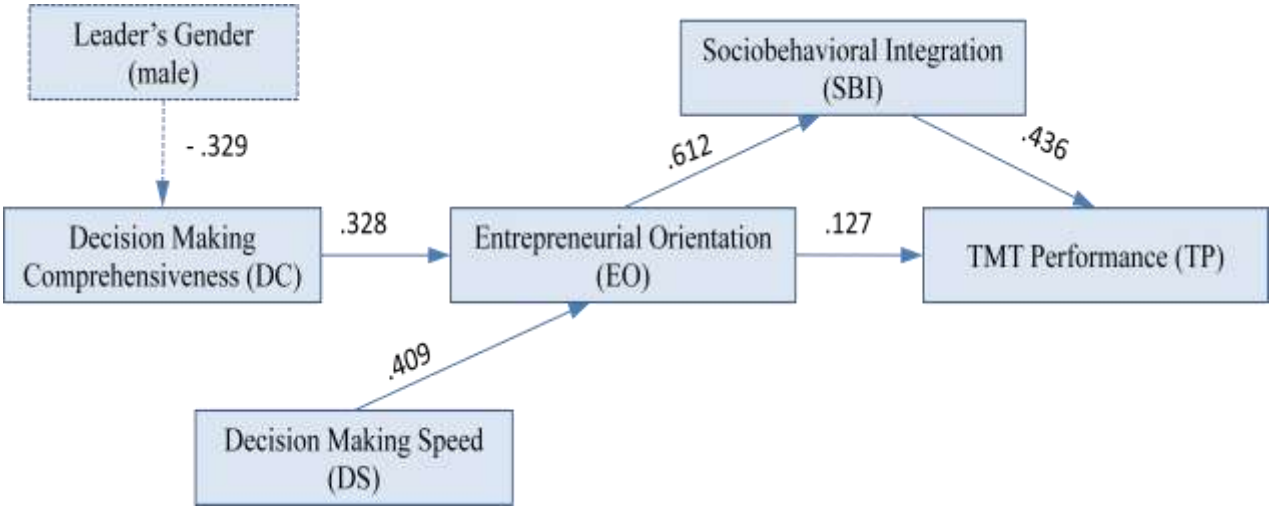

Figure 22 Research model resulting from Multi Regression & Path-Analysis

4.5.2 Using Structural Equation Modeling

After completing the necessary propositions testing, dealing with reliability and validity issues and completing model building using path analysis in the previous sections, Structural Equation Modeling (SEM) will be briefly explored. The purpose is to understand and demonstrate the technique, bring forward its benefits and limitations. Another motivation for this effort is to improve this kind of sequential process of first doing factor extraction and then on the basis of achieved factors carrying out the regression. In most cases the variance explained by these so called extracted factor is some percentage of the construct that in this case has been around 50 – 75%. This means the resulting factors do not carry "full effect" of the items they build upon when doing the regression or other statistical analysis.

Although the sample size is small, still SEM has very good indices that indicate if a model is acceptable, a good fit or not and even what can be done to improve it. So the model fit indices will be particularly indicated for the models presented in this section. In addition a trimmed down output of SEM analysis for one model is listed as reference in the Appendix section.

The following model shows the relationship between performance, entrepreneurial orientation (EO) and sociobehavioral integration (SBI) of the Team. In addition it depicts how EO is related to decision making speed, decision making comprehensiveness and gender (males).

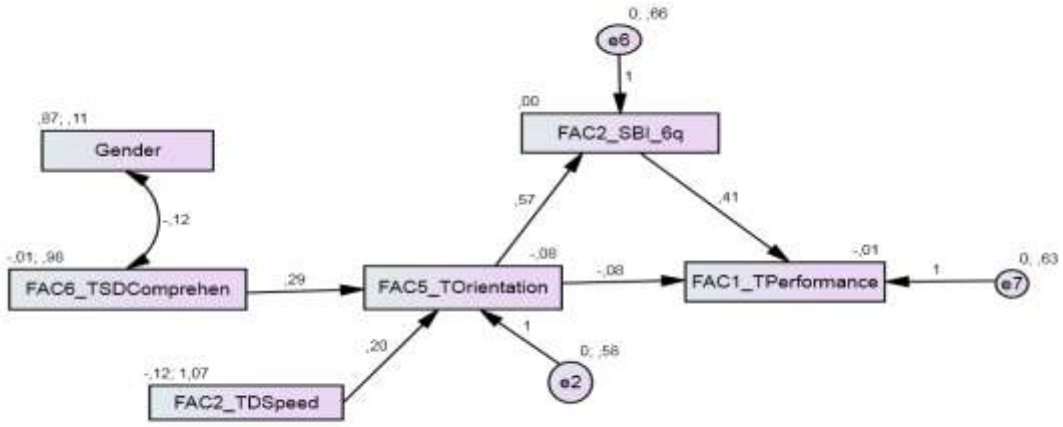

Figure 23 A SEM model similar to the one achieved through Path-Analysis

$\chi 2(7{,}45, n=43)$, dfi = 9 and p=0,590 with CFI = 1.0 RMSEA = 0.00 SRMR= .0612
Based on these values the overall the model had strong indices, is a good fit, therefore acceptable. This model resembles to what achieved through regression & path analysis.
SEM has clear criteria for how to look for strong indices and good-fit model:

- A non-significant chi square ($\chi 2$) indicate no diff. b/w the theoretical & the empirical models (p > 0.05)

- A good fit: Chi square/ degrees of freedom: in this case 7,45/9= .83 (<3 or <5, excellent)

- A high CFI: 1.00 (meaning > 0.95 which is fantastic)

- A low SRMR: 0.061 (≤ 0.08 is what to look for, there for very good)

- An acceptably low RMSA: 0.00 (Good fit < 0,06, reasonable fit 0.06 - 0.08: here best fit)

In another model below, how effectively one can change the model and get the results is exemplified. This is done by removing Gender variable from the model and introducing a covariance relationship between the factors for decision-making factors/ variables.
$\chi 2(2{,}26, n=43)$, dfi = 4 and p=0,688 with CFI = 1.0 RMSEA = 0.00, SRMR = .0527

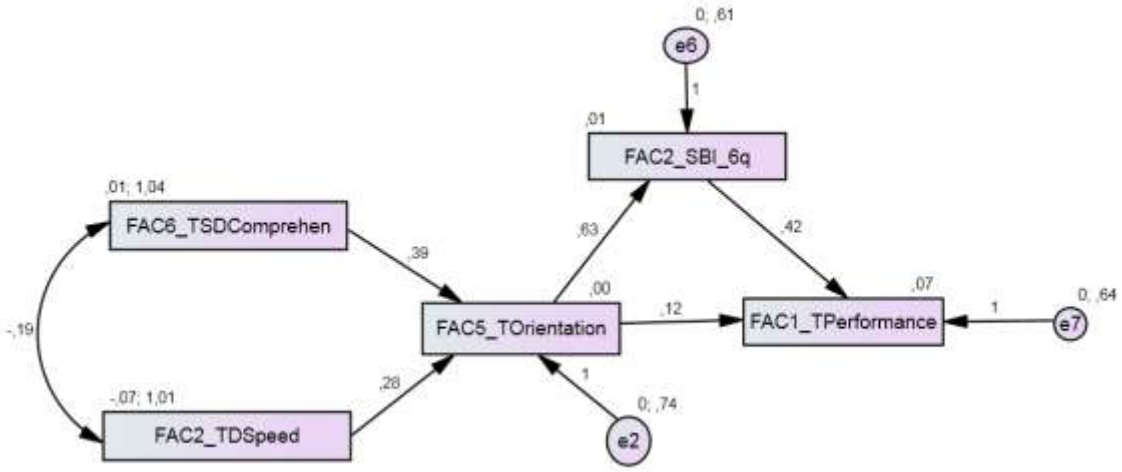

Figure 24 How the values in the model change if Gender variable is taken out ?

In the model below Polychronicity/ multitasking is introduced to study its effects in relation to previous models. Overall, the model indices and good-fit measures are strong:
$\chi 2(7{,}808, n=43)$, dfi = 6 and p=0.253 (p > 0.05) with CFI = 0.954 RMSEA = 0.085.

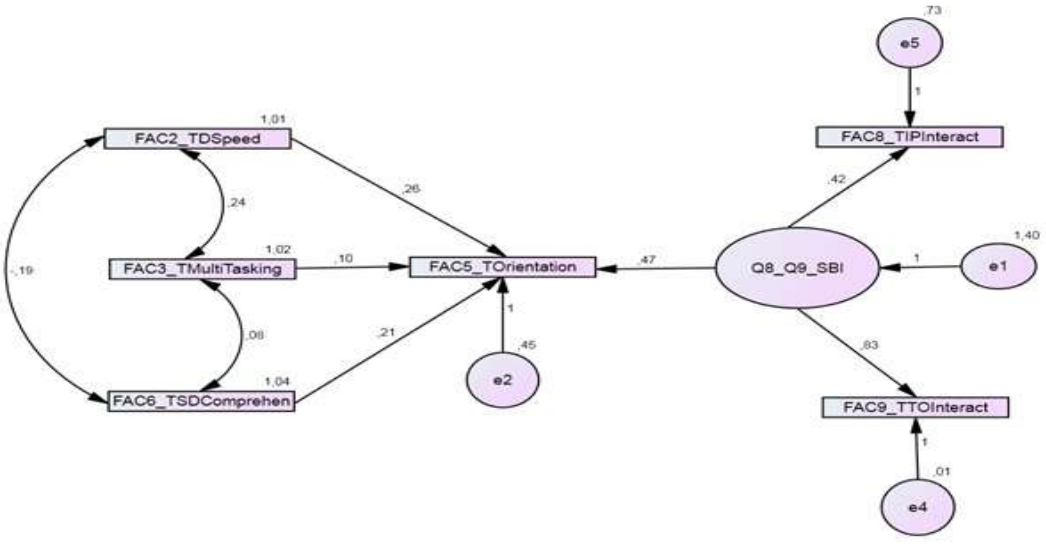

Figure 25 What are the effects of replacing Gender with Multitasking variable ?

One can observe that correlations and covariance are little different than what achieved through regression. The model is run with 1000 bootstrap samples, therefore it supposed to be better than what achieved through normal multi regression. If SEM would have been the focus of this study, there would have been focus on analyzing residuals, checking the outliers issue and on running the model with the survey items rather than their factors.

The model illustrated under is complex in terms of SEM analysis and the purpose of presenting this is to demonstrate the strength of the SEM technique as well as support the discussion in the Polychronicity model above. As mentioned one of the logical next steps for improving the model could be to use the actual items in the model rather than their factors.

Here follows as summary of results:
$\chi 2(374{,}843, n=34)$, dfi = 205 and p=0,00 (p > 0.05) with CFI = 0.401 RMSEA = 0.157. Overall the model is not acceptable because of bad indices. The reasons of course is sample size smaller as compare to number of variables in questions. To improve the model one should also focus on missing data, outliers & analyze residual properly.

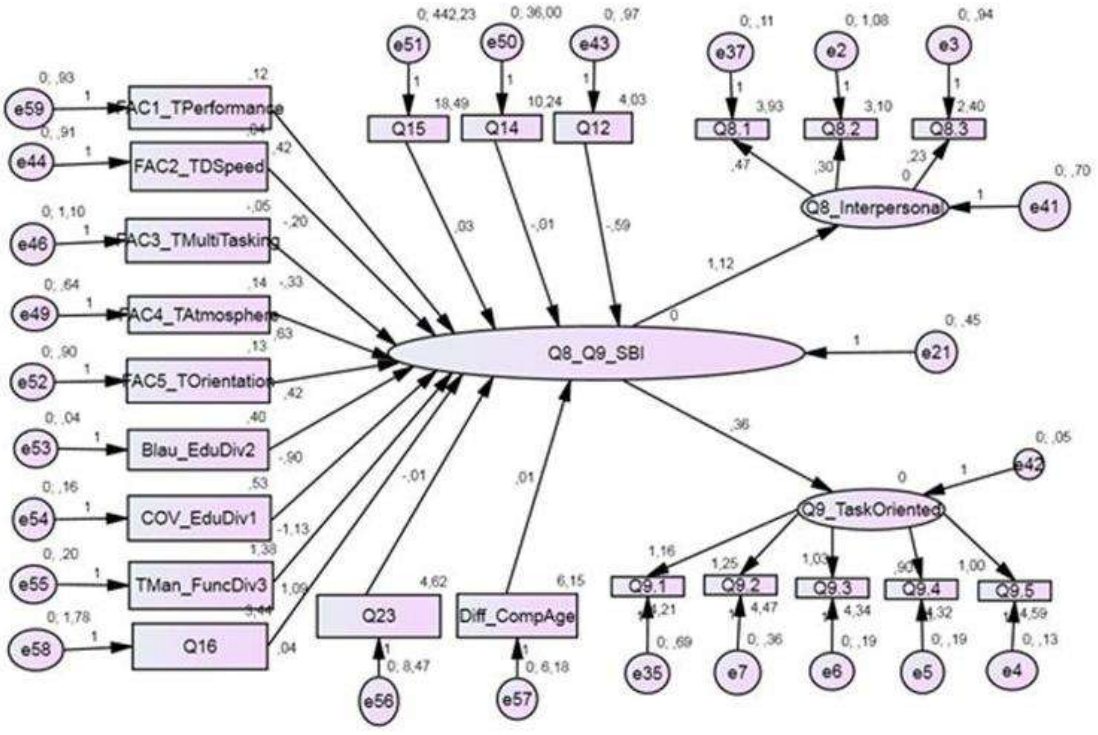

Figure 26 It is far easier to process a complex research model through SEM

5. DISCUSSIONS

This section will briefly elaborate the results that are directly related to study questions and have been worked out in the regression section of chapter 4. The model built after testing propositions will also be discussed with focus on what has been excluded from it. Limitation of this research and suggestion for some future direction will also be covered.

5.1 Associations

The game plan in terms of testing propositions and model building was to rely on established team performance measures. As known, objective performance measures like financial, market position etc are mostly lacking for startups. Even if these are available for some, they are not so readily available for all the companies in the sample.

Table 13 Summary of Propositions that were worked out in this thesis

Proposition No. - Status	**Proposition states that**
P1 – Supported	Socio-behavioral Integration (SBI) will contribute significantly positive to the team Performance, thus will be used as Performance measure.
P2 – Supported	Entrepreneurial Orientation (EO) will contribute significantly positive to the Team Performance, thus will be used as Performance measure.
P3a – Supported	Faster Decision Making Speed (DS) will result stronger Entrepreneurial Orientation (EO) and consequently better Team Performance.
P3b - Supported	Better Decision Making Comprehensiveness (DC) will result in stronger Entrepreneurial Orientation (EO)
P3c - Rejected	Polychronicity (PC) Multitasking will not contribute significantly to Entrepreneurial Orientation (EO), SBI nor to the Team Performance.
P4a – Rejected	Not enough evidence that Age has negative and Gender has positive influence on Entrepreneurial Orientation (EO).
P4b – Rejected	Not enough evidence that "variety" type of Educational and Functional diversities are positively associated with Entrepreneurial Orientation.
P5a – Supported (weak model)	There is evidence that Gender (male) diversity has negative correlation with Decision Making Comprehensiveness, though the model is weak.
P5b – Rejected (weak model)	Not enough evidence that Age diversity has positive influence Decision Making Comprehensiveness, though the model is weak.

Moreover, the survey was supposed to be anonymous and the information given by the respondents have been used and to avoid ethical issues "further digging for more" from other sources have been avoided, thus creating an ethical issue. Considering these factors focus has been shifted towards other performance alternatives mentioned in section 2.3.1. With reference to established research, team constructs that were captured in the survey such as Q1 Teams Perceived Performance (TP), Q5 Entrepreneurial Orientation (EO), Q8 Interpersonal Interactions (IPI) and Q 9 Task-Oriented Interaction (TOI) have been utilized.

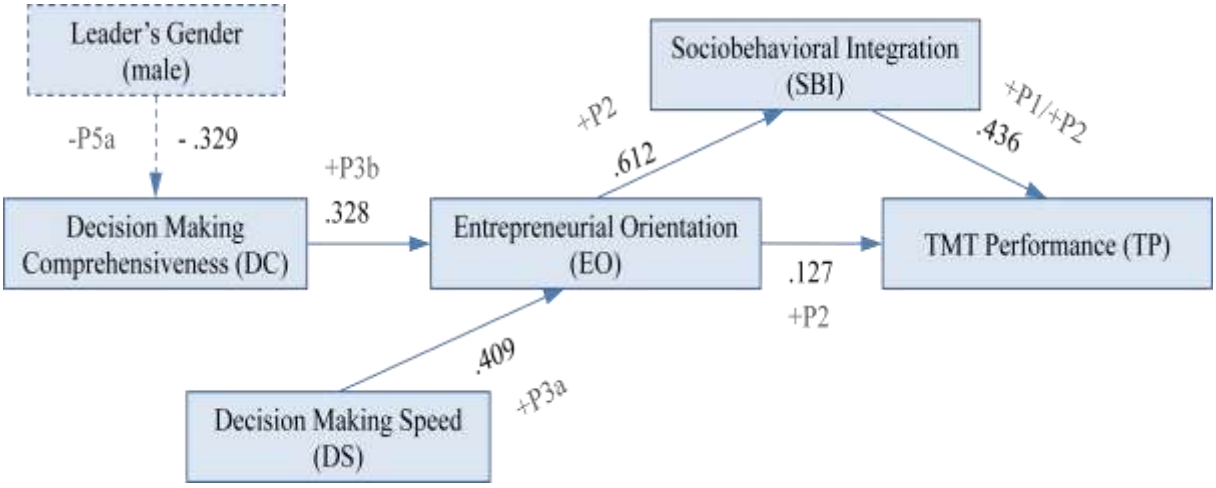

Figure 27 The Research Model achieved through Testing Propositions & Path Analysis

It is worth mentioning that Q8 and Q9 are two sides of the same coin known as Team Integration, as described in the theory section. This meant forming a robust construct termed as Team's Sociobehavioral Integration (SBI) through factor analysis of Q8 and Q9 seemed necessary. This was also inline with Upper-Echelon theory and its characteristics as well with Resource based View and its essential ingredients like the presence of rare & non-imitable resources. In other words, a team that does well both in terms of task-orientation as well as on interpersonal plan will score high on Sociobehavioral Integration (SBI) scale. Thus, SBI as a performance measure supported by this research is inline with the work of known scholars.

5.2 Lack of association

Polychronicity/ multitasking did not found to have significant contribution through regression, though SEM analysis was telling another story. This means improving of factor analysis can be necessary or using SEM and PLS for the analysis.

The diversity measures were not found to have that significant effect as expected. These results are not conclusive due to small sample size, shortcoming in the survey design and diversity measures like leader, team and the firm.

5.3 Research focus and contribution

Although, this research can be termed as of explorative - descriptive nature with a relativist design approach (Mark Easterby-Smith 2008; Lussier 2011), still it provided a fantastic learning experience for the author on many important areas. When following cross sectional study approach multiple factors of interest were measured simultaneously in this study. The main purpose of this was to reveal or even construct underlying relationships and patterns that will eventually explain the phenomenon of leadership, team's processes for a sustainable competitive performance. This would become the basis of more explanatory work of the nature of focused survey, case study, or even grounded theory. . It can be observed at close distance and for some extended period to know more about challenges these companies face and remedies they apply, what does work and what does not. Though basic, still multi-disciplinary study, it provides insight to the team processes and performance measure on huge amount of research work available – still to measure human factors like surface and deep diversity and other cognitive measures. Some researcher have termed this as Understanding the Entrepreneurial Mind, Opening the Black Box (Carsrud and Brännback 2009)

There has been little research on Norwegian high-tech startup companies (Jan Inge Jenssen 2006), though comparable studies from other Nordic and similar countries are more readily available. Therefore, a huge amount of effort gone in to preparing and conducting the survey and there was struggle to get adequate response. This among other things suggests the need of more explorative work to identify areas to focus on for further descriptive and explanatory work. Therefore, the purpose of this study among other things has been to fill that gap. Initially, the author was more inclined to exert his efforts in finding out what leadership type/ style that CEO had make the most influence of performance. The motivation for this was both personal experience in establishing companies and working close to and with other Startups. As this research work progressed and the author reflected upon and read more on the topic, top management team became the focus of this study. TMT in the context of Startups is more than actor in a survival drama – they work on many dimensions all from handling the extreme practical needs with little money and lack of time/ resources. Still having vision and will to

stay and compete with established actors and gain market share inch by inch is a fantastic human endurance. Moreover, all this is happening while team processes for TMT are yet to mature, this is therefore more research is required in terms of TMT in startups with respect to its life cycle. This means recommendation, tips and tools to assist TMT both in making and detailing their 'must do', 'should do' and 'nice to do' decisions and priority list – what to do, how fast and when, resource recruitment, and team maintenance to achieve a well functioning team, when to scale and when to compete? (Carpenter 2006; Nielsen 2009; Chen, Lin et al. 2010; Carpenter 2011)

In terms of utilizing readily available constructs to conduct a study that was tried successfully, still it can be improved substantially. For diversity measurement, the author after extensive search was just able to scratch the surface. In this particular respect progress made was in terms of exploring this area from different angles and establishing its utmost relevancy (Carpenter 2004; Hambrick 2007; Nielsen 2010). The author was successful in distinguishing and measuring diversity both through elementary and advanced statistics. In essence, the start was the common notion of diversity as understood in the light of age, ethnicity, and gender. Through an explorative meta-analysis kind of study, recent work in the field of diversity that is being carried out was explored. Especially in terms of more universally applicable concepts and better operationalizable constructs. Worth mentioning a multi-disciplinary and universal applicable conceptualization in the form of variety, separation and disparity (Harrison and Klein 2007). That after some efforts on the part of statistics was incorporate in this study and seems to have given good and reliable predictions. In terms on total effect of diversity on team processes and outcome the emerging research on Workgroup and Team Faultlines approach was also explored (Thatcher and Patel 2011; Bezrukova, Thatcher et al. 2012; Rico, Sanchez-Manzanares et al. 2012). This statistically was more challenging and due to short time available for this work the focus turned modeling through multi-regression and if some time left getting more experience with structural equation modeling (SEM). This is where this research had to be concluded as deadline for delivering the work approached.

5.4 Areas of improvement

Retrospectively speaking number of areas could be thought or handled differently regarding this research. With a hope that some detail on this matter can be of help for future researchers including the author himself, the main areas of improvement will be briefly described:

1. The author might have chosen a little too wide canvas for this study. With reference to the study of leaders in general and in light of Upper Echelon in specific if is known that the values and personalities of a leader play a role in "strategic" choices they make (Burns 2004; Northouse 2007; Rowe 2007; Carpenter 2011). That is exactly what the author did in taking decision regarding this research. The author would like to admit that thinking and conceptualizing ideas can be a lot easier and may involve just fewer "local" dependencies than operationalizing those same ideas in the context of outside world, which can be a complex and taxing affair. After this first of its kind research experience, the author now knows intimately what to improve in his in his next research assignment. Hopefully this will also help those want to learn from this. What also contributed in choosing a wider angle was the scarcity of TMT research on Norwegian Startups and material about conducting research in Norway. If that was readily available the author might have chosen to build this study existing findings. In addition learning how to build well constructed survey questions and acquire larger sample size etc would also have helped.

2. Initially, answering the question "Why?" or doing explanatory research was author's ambition. This asked for another kind of study setting. As the topic is wide it was difficult what to focus on. As the proposal this study is based on emerges, it suited the reality of TMT research in Norway. Still having focus on a specific area seemed a difficult chore. Therefore, the author likes to emphasize that finalizing research model in the very start of a short-semester long master thesis is essential. That is to focus on fewer constructs for a deeper analysis. One must choose well-established constructs that are well "tested" as question items through in surveys. Otherwise, a lot of time will be used in making sure the reliability of these constructs, the analysis work including model building will be weak, and it will be difficult to interpret results making the research less authentic.

3. In terms of online survey the advice would be to have a small number of in-depth questions that would lead to fewer stronger constructs. Maybe the author ought to reward respondent with some token gifts. All this to increase the response rate and survey quality. Thus having a better foundation for advance statistical techniques like multi regression and structural equation modeling to be applied with more confidence.

4. For quantitative work of this nature, a good grasp on statistics is essential both in terms of elementary to advance hands-on knowledge – all from descriptive and factor analysis to regression and structural equation modeling. Therefore it is strongly recommended to go through courses on practical statistics, before one embarks on an intensive semester long research journey. After acquiring some theoretical basis it is advised to start with example cases where good analysis and elaborated interpretations is given. It is worth spending time on learning from these cases in terms of methods, analysis and interpretation techniques especially by using statistical software like IBM SPSS, AMOS, SmartPLS and WrapPLS.

5. There is need for more research and frequent meta-analysis on Norwegian innovation and entrepreneurship activities especially in terms of high-tech startups & their top management teams. Although the author had access to certain data on fast growing Norwegian companies (DagensNæringsliv 2009; Dun&Bradstreet 2009), still that focused more on economical and performance factors rather than the team and cognitive measures that was one of the focus areas for this study. Other universities in Norway might have collected such data that one can start working on right away instead of designing surveys and acquiring the data first and then analyzing and interpreting that.

5.5 Future Research Directions

Research on Norwegian startup especially in high-tech startup is far from extensive that can be confirmed if one does search for relevant scientific articles on the internet or visit to university library. So instead of tedious search there is a need for frequent meta-analysis and/ or reviews that scans for articles and research work done on a particular topic (Geyskens, Krishnan et al. 2009; Nielsen 2010; Thatcher and Patel 2011). This will help making substantial collective progress rather than doing an academic exercise of doing exploratory and descriptive research on same topics in almost the same way and never have enough ground for explanatory work. Therefore sharing the knowledge is essential and meta-analysis and reviews may help in focusing on a particular area and bringing forward not only pointer to the research, but also analysis, researchers bias, critics and other areas to make intelligent decisions in carrying out a study.

In terms of theory Competitive Dynamics (Barney, Ketchen et al. 2011; Barney 2012; Nair and Selover 2012) is both very valid with respect to contemporary dynamically changing markets and in the context of service and particularly knowledge-based businesses and their respective work forces that are now dominating in Europe and North America (Tan and Asian Productivity Organization. 2003; Wang 2013). Here follows a depiction of Competitive Dynamics research from Ming-Jer Chen's forth coming article (Chen 2012). In addition there is some very nice review of the work done so far in the field as well as future directions as well as structured ideas on proposed framework. It would be great if this model can be adjusted for the use of startups especially in light of the life cycle phase startups usually pass through. Such a specific research could have great advantage; I am sure about this after having intimate experience in being entrepreneur for myself and not having access to relevant models and reference material pertaining to the phase that author's startups were in.

In terms of diversity, the author promoted the research with a focus on practical measurements as proposed by disparity, separation and variety constructs (Harrison and Klein 2007; Klein, Knight et al. 2011) and operationalizing the surface and deeper level dimension can be of interest. Though the name Faultines will not bring positive associations, still the theoretical work and operationalization of aggregated diversity measure in 'Fau' is interesting (Thatcher and Patel 2011; van Knippenberg, Dawson et al. 2011). In these respect statistical techniques like Structural Equation Modeling, Path Least Square can be refined with respect to some holistic model like the one here inspired by this study.

To have a better insight in to how diversities affect human level interactions and subsequently performance continuous data gathering on surface level diversity, situations and exactly what type of differences that are being investigated will help substantially (Harrison and Klein 2007; Klein, Knight et al. 2011). This can be combined with data on deeper level cognitive abilities, how the situation was perceived, decision making patterns, their after effects etc Then these two approaches can be combined first by explorative level studies over a period of time and then based on the findings doing in-depth case studies or grounded theory work (Ulhøi 2007; Klenke 2008; Mark Easterby-Smith 2008) .

5.6 Conclusion

Teams in high-tech startups in Norway have a lot in common with similar teams working elsewhere. Often the results from one type of team can be generalized to a very different type

of team if their contexts have similarities. For example, the research from a startup's top management team can benefit a team of parents and children, Prime minister and his/ her cabinet, Hollywood filmmaker and his team, a team in large multinational and many more. All these being human beings may have varied degrees of motivations, inclinations, capabilities, educational & functional diversities, value set, and many other differentiating characteristics. For high-technology startups the requirements for better functioning of a team are more stringent than for most other teams and this is mainly due to lack of resources, uncertainty and multitude of areas to focus (Nielsen 2009; Nielsen 2010; Carpenter 2011)

In this explorative work, the data from 48 Norwegian high-tech startups was collected and analyzed. The results suggest that entrepreneurial orientation (EO) had positive relationship with sociobehavioral integration (SBI) constructs. In addition, Strategic Decision Speed and Strategic Decision Comprehension were positively correlated with Entrepreneurial Orientation. Polychronicity/ multitasking showed positive correlation with Entrepreneurial Orientation through SEM and not through the proposition testing method of multi regression.

In terms of Diversity measures, the author feels satisfied about having operationalized these in to three dimensions disparity, separation, and variety. By doing exhaustive literature search and finally coming across some thing seemed to work was a fantastic experience. In that respect, this study is part of recent research that is forming the field of diversity research. This will hopefully be influential not only for team related research but for other areas where heterogeneity or similarities are studied. This spans to all the fields where human factor plays an important role. The Structural Equation Modeling (SEM) has been applied to the same set of variables used in regression to demonstrate how effectively SEM can do analysis and modeling work. In this regard, interesting results were achieved that require further in-depth study which may give a better insight and may help developing diversity related composite constructs that are based on theory.

This research proved to be a fantastic learning experience for the author as it covered many important dimensions such as conducting research, survey design and data collection, hand-on experience with statistical techniques, analysis, and interpreting data. Above all, it provided a deeper insight in team processes and human diversity that will be useful in team related activities the author will engage in, both in his personal and professional capacities.

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APPENDIX

Table 14 ***Original Survey Questionnaire***

Leadership Team Survey

Please, kindly respond to each of the following questions:

*Q1 **Team Performance**
Grade the performance of your management team in the light of established performance standards:

	1 Very Low	2	3 Average	4	5 Very High
The amount of work the team produces	①	②	③	④	⑤
The quality of work the team produces	①	②	③	④	⑤
Your overall evaluation of the team's effectiveness	①	②	③	④	⑤

*Q2 **Strategic Decision Speed**

	1 Disagree Strongly	2	3	4	5 Agree Strongly
We prefer and tend to take our time when making strategic decisions	①	②	③	④	⑤
We generally believe in making quick strategic decisions	①	②	③	④	⑤
Please tick the extent (1 being 'not at all' to 5 being 'to a great extent') on which your company places on: speed when planning or thinking about strategies	①	②	③	④	⑤

*Q3 **Multitasking**

	1 Disagree Strongly	2	3	4	5 Agree Strongly
We believe people should try to do many things at the same time	①	②	③	④	⑤
We would rather focus on one project each day than on parts of several projects	①	②	③	④	⑤
We tend to juggle several activities at the same time	①	②	③	④	⑤
We think it is best and tend to complete one task before beginning another	①	②	③	④	⑤
We believe it is best for people to be given several tasks and projects to perform simultaneously	①	②	③	④	⑤

*Q4 **Team Atmosphere**

	1 Never	2 Rarely	3 Sometimes	4 Quite Often	5 Extremely Often or Always
Team members feel inspired at work	①	②	③	④	⑤
Team members feel enthusiastic at work	①	②	③	④	⑤
Team members feel energetic at work	①	②	③	④	⑤
Team members feel excited at work	①	②	③	④	⑤

*Q5 **Team Orientation** To what extent do the following statements apply to your top management team?

	1 Disagree Strongly	2	3	4	5 Agree Strongly
In my team, people are very dynamic	①	②	③	④	⑤
In my team, innovation is emphasized above all	①	②	③	④	⑤
In my team, people are willing to take risks	①	②	③	④	⑤
In my team, willingness to continuous progress is the joint foundation	①	②	③	④	⑤
In my team, people are eager at being always first to market	①	②	③	④	⑤

***Q6 **Strategic Decision Comprehensiveness** Faced with an immediate, important, non-routine threat or opportunity, we usually:

	1 Disagree Strongly	2	3	4	5 Agree Strongly
…develop many alternative responses	①	②	③	④	⑤
...consider many different criteria and issues when deciding the course of action to take	①	②	③	④	⑤
…thoroughly examine multiple explanations for the problem or opportunity	①	②	③	④	⑤
…conduct multiple	①	②	③	④	⑤

examinations for the suggested course of action					
…search extensively for possible responses	①	②	③	④	⑤

*Q7 **Time Orientation and Rhythm**

	1 Disagree Strongly	2	3	4	5 Agree Strongly
We believe our organization needs to learn from past/historical experiences	①	②	③	④	⑤
The rhythm of work processes in our organization changes every week	①	②	③	④	⑤
My organization can mobilize extra efforts on short notice	①	②	③	④	⑤
My working weeks are easily predictable	①	②	③	④	⑤
Every hour somebody interrupt my planned work	①	②	③	④	⑤
Deadlines in my work are normally extremely strict	①	②	③	④	⑤

*Q8 **Team Integration**

A. Interpersonal Interaction Members of the top management team in my company...

	1 Does Not Apply At All	2	3	4	5 Completely Applies
enjoy cultivating personal connections with each other	①	②	③	④	⑤
interact frequently outside the work place	①	②	③	④	⑤

interact with each other's family in various get-together activities	①	②	③	④	⑤

*Q9 **B. Task-oriented Interaction** Members of the top management team in my company...

	1 Does Not Apply At All	2	3	4	5 Completely Applies
develop a large network of colleagues and associates at work they could call on for support when necessary.	①	②	③	④	⑤
are ready to help each other complete jobs and meet deadlines.	①	②	③	④	⑤
will defend each other promptly when facing external criticism.	①	②	③	④	⑤
proactively remind executives of potential problems and assist in resolving them.	①	②	③	④	⑤
will help me to achieve my goal through their successful experiences.	①	②	③	④	⑤

*** Time Budget**

Please indicate your time budget used in one week in %:

* Q10 Workload defined by premises in the past (in %) ☐

* Q11 Workload defined by premises set for the future activities (in %) ☐

About your management team

*Q12 **What is your age?**

18 - 23

24 - 30

31 - 40

41 - 50

51 - 60

61 and over

*Q13 **What is your gender?**

Female

Male

*Q14 **How many years of experience do you have as top leadership team member?**

*Q15 **What is the CEO's ownership percentage in the company, approximately in %?**

*Q16 **How many members are part of your top management team?**

*Q17 **How many of the top management team including yourself have completed following educational degrees?**

Bachelor	
Master	
Ph.D.	

*Q18 **What is the cumulative number of years of industry experience within the management team, including former employments?**

*Q19 **How many members of the top management team fulfill the following functional roles?**

Engineering	
Finance	
Human Resources	
Marketing	
Operations	
Research & Development	
Other Functional Roles	

Q20 **Please rank a maximum of three types of diversities you consider as most important for the success of a management team:**

No Diversity	①	②	③
Age	①	②	③
Cultural	①	②	③
Educational	①	②	③
Functional	①	②	③
Gender	①	②	③
Social	①	②	③
Other, please specify	①	②	③

About your Company

*Q21 **What year was the company established?**

*Q22 **Please indicate the industry the company is operating in:**

*Q23 **How many people work full-time for the company?**

*Q24 **Is the company located within a university incubator (e.g. technology park, science park, etc.)?**

Yes

No

*Q25 **Has the company received any of the following fundings:**

	Yes	No
Seed Capital	①	②
Venture Capital	①	②

Q26 **How many patents does the company currently hold or has applied for?**

*Q27 **Does the company cooperate with direct competitors as business partners (e.g. as suppliers, buyers, subcontractors)?**

Yes

No

*Q28 **In which year did the discovery of your technology (i.e., technological breakthrough) take place?**

*Q29 **When did the technological development (i.e., development of prototype) start?**

*Q30 **When did the company have its first sales or expect to sale?**

Q31 **Thank you! we appreciate your response.** By providing us with your company name, we might be able to find more interesting background information about your company and technology in order to enrich the information you gave us in this short survey. Also this self-selected information will be treated confidentially. In order to receive an executive summary, please provide your email address.

Company Name:

Email Address:

Note: in this copy of the survey the question numbers are shown which was not the case in the original survey. There, the questions which were obligatory were marked with a star. The look & feel of the original online survey was somewhat different than what is presented here.

Organizational Life Cycle Phases (Miller and Friesen 1984)

Here follows another interesting model to look at. That is in addition to what described in section 2.1.2 as The life of a Startup with respect to financing while Team's life cycle is elaborated through Tuckman's team model in the section 2.1.7.

Table 15 Organizational Life Cycle Phases (Miller and Friesen 1984)

Birth Phase: (cf. Scott's (1971) Stage One, Greiner's (1972) Creativity Stage, Quinn & Cameron's (1983) Entrepreneurial Stage)	• Small firm • Young • Dominated by owner-manager • Homogeneous, placid environment	• Informal structure • Undifferentiated • Power highly centralized • Crude information processing & decision making methods	• Considerable innovation in produce lines • Niche Strategy • Substantial risk taking
Growth Phase: (cf. Down's (1967) Rapid Growth Stage, Adizes' (1979) Go-go Stage. Lyden's (1975) Second Stage)	• Medium sized • Older • Multiple shareholders • More heterogeneous and competitive environment	• Some formalization of structure • Functional basis of organization • Moderate differentiation • Somewhat less centralized • Initial development of formal info. Processing and decision making methods	• Broadening of product market scope into closely related areas • Incremental innovation in product lines • Rapid growth
Maturity Phase: (cf. Scott's (1971) Stage 2, Greiner's (1972) Direction Stage Azides' (1979) Maturity Stage)	• Larger • Still older • Dispersed ownership • Competitive and still more heterogeneous environment	• Formal, bureaucratic structure • Functional basis of organization • Moderate differentiation • Moderate centralization • Information processing and decision making as in growth phase	• Consolidation of product market strategy • Focus on efficiently supplying a well-defined market • Conservatism • Slower growth
Revival Phase: (cf. Scott's (1971) Stage 3, Greiner's Coord'n. Stage, Quinn 4 Cameron's (1983) Elaboration of Structure Stage)	• Very large • Environment very heterogeneous, competitive and dynamic	• Divisional basis of organization • High differentiation • Sophisticated controls, scanning and communications in info. processing; more formal analysis in decision making	• Strategy of product market diversification, movement into some unrelated markets • High level of risk taking & planning • Substantial innovation • Rapid growth
Decline Phase: (cf. Downs'(1967) Deceleration Phase, Lyden's (1975) and Kimberly's(1979) Fourth Stages, and Adizes' (1979) Prime Organizational Stage)	• Market size • Homogeneous and competitive environment	• Formal, bureaucratic structure • Mostly functional basis for organization • Moderate differentiation and centralization • Less sophisticated information • processing systems and decision making methods	• Low level of innovation • Price cutting • Consolidation of product market • Liquidation of subsidiaries • Risk aversion or conservatism • Slow growth

Diversity Measurement Guidelines by Harrison and Klein (2007)

G1: Theory building regarding diversity is enhanced by authors' explicit specification and justification of the diversity type of interest: separation (S), variety (V), or disparity (D).

G2: Theory building about diversity is enhanced by a careful visualization of the shape and consequences of maximum separation, maximum variety, or maximum disparity. In contemplating these maxima, scholars shift their focus from differences within dyads to the pattern of differences within the unit as a whole.

G 3: In cases for which diversity of unit members on the same characteristic (e.g., tenure) may be meaningfully conceptualized in different ways—that is, as separation, as variety, or as disparity—precise specification of diversity type is essential. It allows theorists to differentiate and compare conceptual models, facilitating understanding and cross-fertilization and paving the way for empirical tests of contrasting conceptions.

G4: The choice of a diversity index should be driven by the theoretical specification of diversity type; researchers must answer what the vital difference is before they choose or design indexes to measure it. If the specified conceptualization and index of diversity are mismatched, research conclusions may be misleading. Researchers specifying diversity as separation should use versions of SD or average Euclidean distance. Researchers specifying diversity as variety should use versions of Blau's or Teachman's (entropy) index. Researchers specifying diversity as disparity should use versions of CoV or the Gini coefficient.

G 5: In testing the relationship between separation or disparity of an attribute and other variables, researchers should first statistically control for the within-group mean of the attribute.

G 6: The use of common disparity measures carries an implicit assumption about the shape of a negative interactive effect between the variability and the mean of a diversity attribute. That assumption should be tested by entering variability, mean, and the variability-by-mean interaction to see if the former is indeed moderated by the latter.

G7: Simple (average or total) operationalization of overall diversity should be avoided unless (a) theoretical motivations for their aggregate (formative) effects are clear, or (b) evidence of their convergent validity can be shown.

G 8: Measures of perceived diversity should not substitute for measures of actual diversity. Measures of perceived diversity can, however, provide an operationalization of a useful, substantive construct—members' perceptions of unit diversity—that may be related to but is different from actual unit diversity.

G 9: If researchers use measures of perceived diversity, their questions, response formats, and anchors should reflect the diversity type under consideration, following the distributions shown.

G 10: To allow an adequate test of Propositions/ hypotheses regarding separation, variety, and disparity, respectively, a researcher's sample must evidence substantial between-unit variability in within-unit separation, variety, or disparity. Units should represent the full range of minimum to maximum separation, variety, or disparity, respectively. In the specific case of separation, the sample must allow verification of the symmetry assumption fundamental to that diversity type.

Table 16 Diversity Type, Meaning & Theories (Harrison and Klein 2007)

Meanings and Properties of Within-Unit Diversity Types

Diversity Type	Meaning and Synonyms	Attribute Shape at Maximum Diversity	Attribute Examples	Predicted Outcomes[a]	Foundational Theories
Separation (on attribute S)	Composition of differences in (lateral) position or opinion among unit members, primarily of value, belief, or attitude; disagreement or opposition	*Bimodal* distribution, with half of unit members at highest and lowest endpoints of *S continuum*	Opinions, beliefs, values, and attitudes, especially regarding team goals and processes	Reduced cohesiveness, more interpersonal conflict, distrust, decreased task performance	Similarity attraction; social categorization; attraction, selection, and attrition (ASA)
Variety (on attribute V)	Composition of differences in kind, source, or category of relevant knowledge or experience among unit members; unique or distinctive information	*Uniform* distribution, with even spread of members across all possible categories of V (no continuum)	Content expertise, functional background, nonredundant network ties, industry experience	Greater creativity, innovation, higher decision quality, more task conflict, increased unit flexibility	Information processing; law of requisite variety; variation, selection, and retention (VSR)
Disparity (on attribute D)	Composition of (vertical) differences in proportion of socially valued assets or resources held among unit members; inequality or relative concentration	*Positively skewed* distribution, with one member at highest endpoint of D *continuum* and others at lowest	Pay, income, prestige, status, decision-making authority, social power	More within-unit competition, resentful deviance, reduced member input, withdrawal	Distributive (in)justice and (in)equity; status hierarchy; tournament; social stratification

[a] Generally, but not in all diversity conceptualizations or studies.

Adjusting and Operationalizing Dataset

I adjusted all variables according to the right scale of measurement and relabeled those, so it becomes easier to recognize them when doing analysis. Open questions like Q 22 got adjusted on the basis of responses it received: 1= Biotech, 2= Energy, 3= ICT, 4=Industry, 5=Other Tech., 6= other. For Q 20.1 – 20.8 I did recoding by SPSS transform function in to same variables - No diversity to be coded with 0 while the preference numbers were reversed meaning top preference got a high score of 3 instead of 1 and last preference got code as 1 instead of 3 while 2 remain as 2.

Q1 – Q9 factor extraction through Exploratory Factor Analysis (EFA). Although these questions were made available to us as ready to use construct, this excludes 21 other separate questions with almost all diversity ones. Multiple methods were possible: take one representative question, summation or averaging questions, extracting factor through EFA, (also SEM & PLS as afterwards revealed) . At that time EFA seemed more professional and had its benefits as described in great detail in the book (Hair 2010) with settings such as Extraction: Principal Components, Correlation Matrix, Display Both options selected, Extract eigenvalues greater than 1, Max Iterations for Convergence is 25, Rotation: Varian, Display options both selected, Max Iterations 25, Scores: Save as Variables selected, Method – Anderson-Rubin, Display options selected, Options: Exclude cases listwise, Coefficient Display both options selected, Absolute value below 0.3

-Q1.1 – 1.3 factored as FAC1_TPerformance, Factor _Q1.1 - 1.3 Team Performance

-Q2.1 – 2.3 first try result in two factors therefore taking out Q 2.3 which is confusing

-Q2.1 – 2.2 factored as FAC2_TDSpeed, Q2.1 - 2.2 Teams Decision Making Speed

-Q3.1 – 3.5 trying all and finding out that Q3.3 loading was under 0.5 so taking it out. Still it did not improve therefore keeping it in as it improves KMO measure

-Q3.1 – 3.5 factored as FAC3_TMultiTasking, Q3.1 - 3.5 Team Multitasking

-Q4.1 – 4.4 factored as FAC4_TAtmosphere, Q4.1 - 4.4 Team Atmosphere

-Q5.1 – 5.5 loading is not good especially for Q5.3 taking it out does not make it better

-Q5.1 – 5.5 factored as FAC5_TOrientation, Q5.1 - 5.5 Team Entrepreneurial Orient.

-Q6.1 – 6.5 loading is not good especially for Q6.2 taking it out does not make it better

-Q6.1 – 6.5 factored as FAC6_TSDComprehen, Q6.1 - 6.5 Strategic Decision Comprehensiveness.

-Q7.1 – 7.6 is creating three factors and much combination tried to avoid this and not sufficient number of questions can be gathering in to one factored.

-Q7.1 – 7.6 summated as FAC7_TTimeRhythm, Q7.1 - 7.6 Time Orientation and Rhythm
-Q7.3 – 7.4 Factored as FAC7b_TTimeRhythm, Q7.1 - 7.6 Team's Time Orientation Rhythm.
-Q8.1 – 8.3 Factored as FAC8_TIPInteract, Q8.1 - 8.3 Interpersonal interactions
-Q9.1 – 9.5 Factored as FAC9_TTOInteract, Q9.1 - 9.5 Team's Task-oriented interaction

Demystifying Q10 & 11 regarding past and future Workloads. It is subjective mental workload that may point to cognitive assessment of tacking workload stress
Delta ratio = (Future Workload Q11 – Past Workload Q10)/100
If + value then Future workload will be more than past may indicate optimism or stress
If - value then Future workload will be less and may indicate pessimism or tackling stress
The question needs to be mixed with another variable to what exactly it interprets to.

Diversity questions Q12 what is your age? If Age is taken as experience then a sign of status or Disparity otherwise Variety.
There are 6 groups defined still I get the response from one person per team suggesting that I can NOT find the diversity of each team, but may find the diversity of the survey group. Coefficient of variance or CV will be used. Literature suggests that Blau Index cannot be used for age intervals/ continuum - Age heterogeneity is measured through coefficient of variation (C.V) using the formula: C.V = (S.D/Mean x 100) %. Many research practitioners calculated the age heterogeneity in workgroups by the same methodology (Allison, 1978; Wiersema and Bantel, 1992; Knight et al., 1999).
- CoV = (S.D/Mean x 100) % = 1.010/3.93 x 100 = 0,257 x 100 = 25.70%
-By SPSS Compute Variable and CFVAR function = CFVAR (5,3,3,4,3,4,4,5,4,4,2,4,4,6,4,3,3,4,5,3,6,2,4,5,4,4,5,3,3,5,3,4,5,3,3,3,6,3,4,4,5)=0,26 x 100
- To calculate using Blau Index = $1 - \sum (pk)^2$
1- (((0/41)**2)+((2/41)**2)+((13/41)**2)+((15/41)**2) + ((8/41)**2)+((3/41)**2)) = 0,72
-To calculate using Teachman Index $- \sum [pk \cdot \ln(pk)]$
-(((0/41) * ln (0/41)) + ((2/41)*ln (2/41)) + ((13/41)*ln (13/41)) + ((15/41)*ln (15/41)) + ((8/41)*ln (8/41))+ ((3/41)*ln (3/41))) =

Diversity Variety (or Disparity) for Q13 what is your gender?
Two groups male and female. More or less same logic as above
- CV = (S.D/Mean x 100) % = 0,358/1,85x 100 = 0,194x 100 = 19,40%
- To calculate using Blau Index = = $1 - \sum (pk)^2$

1- (((6/41)**2) + ((35/41)**2)) = 0,25

- To calculate using Teachman Index - ∑ [pk . ln(pk)]

- (((6/41) * ln (6/41)) + ((35/41) * ln (35/41)))

Example: 2 Men and Two Women ,

Test: 1- (((2/4)**2)+ ((2/4)**2)) = 0,5 Maximum, Minimum 0

Diversity Variety (or Disparity or Separation) for Q17. TMT Educational Degrees

How many of the top management team including you have completed following educational degrees?

Bachelor , Master , Ph.D.

Three groups so more or less same logic as above

- CV = (S.D/Mean x 100) %
- To calculate using Blau Index = = 1 - ∑ $(pk)^2$

1-(Sum(((Q17.1)/Sum(Q17.1,Q17.2,Q17.3))**2) , (((Q17.2)/Sum(Q17.1,Q17.2,Q17.3))**2) , (((Q17.3)/Sum(Q17.1,Q17.2,Q17.3))**2))

- To calculate using Teachman Index - ∑ [pk . ln(pk)]

- (Sum(((Q17.1)/Sum(Q17.1,Q17.2,Q17.3))*ln((Q17.1)/Sum(Q17.1,Q17.2,Q17.3))) , (((Q17.2)/Sum(Q17.1,Q17.2,Q17.3)) * ln ((Q17.1)/Sum(Q17.1,Q17.2,Q17.3))) , (((Q17.3)/Sum(Q17.1,Q17.2,Q17.3))* ln ((Q17.1)/Sum(Q17.1,Q17.2,Q17.3))))

Or define a variable Sum_TMTEdu=Sum(Q17.1,Q17.2,Q17.3)

TMan_EduDiv4= - Sum (((Q17.1/Sum_TMTEdu)*ln(Q17.1/Sum_TMTEdu)), ((Q17.2/Sum_TMTEdu) * ln(Q17.2/Sum_TMTEdu)), ((Q17.3/Sum_TMTEdu)* ln(Q17.3/Sum_TMTEdu)))

Diversity Variety (or Disparity or Separation) for Q 19. Functional Role

How many members of the top management team fulfill the following functional roles? 1. Engineering, 2. Finance , 3. Human Resources , 4. Marketing, 5. Operations, 6. Research & Development , 7. Other Functional Roles

7 groups so more or less same logic as above in addition the total number in this team can also be calculated

- Total number TMT in all functional roles = Sum_TMTFunc
- CV = (S.D/Mean x 100) %

SD(Q19.1,Q19.2,Q19.3,Q19.4,Q19.5,Q19.6,Q19.7)/Mean(Q19.1,Q19.2,Q19.3,Q19.4,Q19.5, Q19.6,Q19.7)

- To calculate using Blau Index = = 1 - ∑ $(pk)^2$

1 - (Sum(((Q19.1/Sum_TMTFunc)**2) , ((Q19.2/Sum_TMTFunc)**2)
,((Q19.3/Sum_TMTFunc) **2),
((Q19.4/Sum_TMTFunc)**2),((Q19.5/Sum_TMTFunc)**2),((Q19.6/Sum_TMTFunc)**2),
((Q19.7/Sum_TMTFunc)**2)))

- To calculate using Teachman Index - ∑ [pk . ln(pk)]

- (Sum(((Q19.1/Sum_TMTFunc)* ln (Q19.1/Sum_TMTFunc)), ((Q19.2/Sum_TMTFunc)* ln (Q19.2/Sum_TMTFunc)) ,((Q19.3/Sum_TMTFunc) * ln (Q19.3/Sum_TMTFunc)),
((Q19.4/Sum_TMTFunc)* ln (Q19.4/Sum_TMTFunc)),((Q19.5/Sum_TMTFunc)* ln (Q19.5/Sum_TMTFunc)),((Q19.6/Sum_TMTFunc)* ln (Q19.6/Sum_TMTFunc)),
((Q19.7/Sum_TMTFunc)* ln (Q19.7/Sum_TMTFunc))))

Diversity - Separation (or Disparity or Variety) for Q 20 Your Perception of Diversity

Please rank a maximum of three types of diversities you consider as most important for the success of a management team:

No Diversity, Age, Gender, Educational, Functional, Social, Cultural, Other (Experience)

This will be counted two ways one for whole the sample and 2ndly for each company.

Per Company:

Sum_TMTPDiv= SUM(Q20.1,Q20.2,Q20.3,Q20.4,Q20.5,Q20.6,Q20.7,Q20.8)

CV = (S.D/Mean x 100)

SD(Q20.1,Q20.2,Q20.3,Q20.4,Q20.5,Q20.6,Q20.7,Q20.7,,Q20.8)/Mean(Q20.1,Q20.2,Q20.3,Q20.4,Q20.5,Q20.6,Q20.7,Q20.8)

- To calculate using Blau Index = = 1 - ∑ $(pk)^2$
- 1 - (Sum(((Q20.1/Sum_TMTPDiv)**2) , ((Q20.2/Sum_TMTPDiv)**2)
,((Q20.3/Sum_TMTPDiv) **2), ((Q20.4/Sum_TMTPDiv)**2),((Q20.5/Sum_TMTPDiv)**2)
,((Q20.6/Sum_TMTPDiv)**2), ((Q20.7/Sum_TMTPDiv)**2),
((Q20.8/Sum_TMTPDiv)**2)))
- To calculate using Teachman Index - ∑ [pk . ln(pk)]

(It is difficult to measure a composite measure of perceived diversity without changing the measuring scale – may be reordering or using these as separate variables)

Diversity Questions? - Separation (or Disparity or Variety) for Q 21, Q28, Q29 Compute Progress company made –Different Years

- Q21 Age of the Company_ 2011 minus when company established in Q21,

Q21 Diff_CompAge = 2011 - Q21 If Q21 >= 1999 <= 2011

- Q28_Since Discovery of technology_ 2011 minus when company discovered tech in Q28

Q 28 Diff_TechDisc = 2011 - Q28 If Q28 >= 1980 <= 2030

- Q29_Since Development technology_ 2011 minus when company developed tech in Q29

Q 29 Diff_TechDev = 2011 - Q29 If Q29 >= 1980 <= 2030

- Q30_Sales of products/ technology_ 2011 minus when company begins selling Q30

Q 30 Diff_TechDev = 2011 - Q29 If Q29 >= 1980 <= 2030

Diversity Questions? - Separation (or Disparity or Variety Q 24, Q25 on Seed & Venture Capital

The Values in Question 24 and 25.1 & 25.2 can mislead Yes =1 & No= 2 - this may be Ok for graphical representation etc but not for statistical computations. Therefore recoding it to Yes=1 & No= 0.

Diversity Questions? Variety (or Disparity or Separation) for Q 22 – through this Industry diversity can be measure for the whole sample rather than for the team for the whole sample

Please indicate the industry the company is operating in:

Normalized to: 1= Biotech, 2= Energy, 3= ICT, 4=Industry, 5=Other Tech., 6= Others.

6 groups so more or less same logic as Total number TMT in all functional roles = Sum_Func

- CV = (S.D/Mean x 100) %

SD(Q19.1,Q19.2,Q19.3,Q19.4,Q19.5,Q19.6,Q19.7)/Mean(Q19.1,Q19.2,Q19.3,Q19.4,Q19.5, Q19.6,Q19.7)

- To calculate using Blau Index = = 1 - $\sum (pk)^2$
- 1 - (Sum(((Q20.1/Sum_TMTPDiv)**2) , ((Q20.2/Sum_TMTPDiv)**2) ,((Q20.3/Sum_TMTPDiv) **2), ((Q20.4/Sum_TMTPDiv)**2),((Q20.5/Sum_TMTPDiv)**2) ,((Q20.6/Sum_TMTPDiv)**2), ((Q20.7/Sum_TMTPDiv)**2), ((Q20.8/Sum_TMTPDiv)**2)))
- To calculate using Teachman Index - $\sum [pk . ln(pk)]$

- (Sum(((Q19.1/Sum_TMTFunc)* ln (Q19.1/Sum_TMTFunc)), ((Q19.2/Sum_TMTFunc)* ln (Q19.1/Sum_TMTFunc)) ,((Q19.3/Sum_TMTFunc) * ln (Q19.1/Sum_TMTFunc)), ((Q19.4/Sum_TMTFunc)* ln (Q19.1/Sum_TMTFunc)),((Q19.5/Sum_TMTFunc)* ln (Q19.1/Sum_TMTFunc)),((Q19.6/Sum_TMTFunc)* ln (Q19.1/Sum_TMTFunc)), ((Q19.7/Sum_TMTFunc)* ln (Q19.1/Sum_TMTFunc))))

Doing many tedious & time consuming diversity and other analysis

Refactoring through EFA after number of trials Q1, Q4, and Q8 & Q9 – these can be grouped as one factor FAC1489_BehavInt, though literature support will be required.

Refactoring through EFA after number of trials Q2, Q3 - these can be grouped as one factor FAC23_DSpeedPoly, though literature support will be required.

For SEM analysis the missing data is an issue therefore for a complete research question model as in 2.4 either removing such data or even better transforming that data, how?

Table 17 Descriptive Analysis

Questions	Min	Max	Mean	SD
Q 1. Team Performance				
1.1 The amount of work the team produces	2	5	3.96	.798
1.2 The quality of work the team produces	3	5	4.02	.699
1.3 Your overall evaluation of the team's effectiveness	2	5	3.79	.743
Q 2. Team Strategic Decision Speed				
2.1 We prefer and tend to take our time when making strategic decisions	1	4	2.85	1.010
2.2 We generally believe in making quick strategic decisions	1	5	3.10	1.057
2.3 Please tick the extent (1 being 'not at all' to 5 being 'to a great extent') on which your company places on: speed when	1	5	2.60	.962
Q 3. Multitasking/ Polychronicity				
3.We believe people should try to do many things at the same time	1	5	3.15	1.052
3.2 We would rather focus on one project each day than on parts of several projects	1	5	3.13	1.160
3.3 We tend to juggle several activities at the same time	1	5	3.75	1.042
3.4 We think it is best and tend to complete one task before beginning another	1	5	3.15	1.148
3.5 We believe it is best for people to be given several tasks and projects to perform simultaneously	1	5	2.88	1.003
Q 4. Team Atmosphere				
4.1 Team members feel inspired at work	2	5	4.10	.627
4.2 Team members feel enthusiastic at work	2	5	3.98	.699
4.3 Team members feel energetic at work	2	5	3.96	.617
4.4 Team members feel excited at work	2	5	3.90	.627
Q 5. Team and Entrepreneurial Orientation				
5.1 In my team, people are very dynamic	2	5	3.98	.856
5.2 In my team, innovation is emphasized above all	2	5	3.74	.855
5.3 In my team, people are willing to take risks	2	5	3.59	.858
5.4 In my team, willingness to continuous progress is the joint foundation	3	5	4.11	.706

5.5 In my team, people are eager at being always first to market	1	5	3.54	.912
Q 6. Strategic Decision Comprehensiveness				
6.1 …develop many alternative responses	1	5	3.37	.928
6.2 ...consider many different criteria and issues when deciding the course of action to take	2	5	3.78	.814
6.3 …thoroughly examine multiple explanations for the problem or opportunity	1	5	3.48	.937
6.4 …conduct multiple examinations for the suggested course of action	2	5	3.41	.832
6.5 …search extensively for possible responses	1	5	3.30	.891
Q 7. Time Orientation and Rhythm				
7.1 We believe our organization needs to learn from past/historical experiences	2	5	4.30	.785
7.2 The rhythm of work processes in our organization changes every week	1	5	3.26	1.104
7.3 My organization can mobilize extra efforts on short notice	1	5	4.07	1.020
7.4 My working weeks are easily predictable	1	5	2.17	1.122
7.5 Every hour somebody interrupt my planned work	1	5	2.96	.893
7.6 Deadlines in my work are normally extremely strict	1	5	3.39	.977
Q 8. Team Integration & Interpersonal Interaction				
8.1 enjoy cultivating personal connections with each other	1	5	3.33	.993
8.2 interact frequently outside the work place	1	5	2.77	1.151
8.3 interact with each other's family in various get-together activities	1	5	2.09	1.019
Q 9. Team Integration & Task-oriented Interaction				
9.1 develop a large network of colleagues and associates at work they could call on for support when necessary.	1	5	3.65	1.152
9.2 are ready to help each other complete jobs and meet deadlines.	1	5	3.95	.999
9.3 will defend each other promptly when facing external criticism.	2	5	3.88	.851
9.4 proactively remind executives of potential problems and assist in resolving them.	2	5	3.93	.737
9.5 will help me to achieve my goal through their successful experiences.	2	5	4.16	.721
Q 10-11. Team Workload				
10 Workload defined by premises in the past (in %)	0	100	55.23	28.072
11 Workload defined by premises set for future activities (in %)	0	100	60.12	26.981
Q 12 – 30 CEO/ TMT/ Firm Diversity & Misc Questions				
12 What is your age?	2	6	3.93	1.010
13 What is your gender?	1	2	1.85	.358
14 How many years of experience do you have as top leadership team member?	1	25	9.49	6.524
15 What is the CEO's ownership percentage in the company, approximately in %?	0	95	16.73	20.408
16 How many members is part of your top management team?	1	8	3.66	1.527
17.1 Bachelor , Q 17: How many of the top management team including yourself have completed following	0	4	1.69	1.250
17.2 Master	1	6	2.39	1.264

17.3 Ph.D.	0	5	1.50	1.056
18 What is the cumulative number of years of industry experience within the management team, including former employments?	6	120	47.12	27.073
19.1 Engineering, Q 19: How many members of the top management team fulfill the following functional roles?	0	5	1.79	1.038
19.2 Finance	0	6	1.29	1.001
19.3 Human Resources	0	6	1.21	1.449
19.4 Marketing	0	6	1.70	1.179
19.5 Operations	0	6	1.60	1.192
19.6 Research & Development	1	5	1.92	1.164
19.7 Other Functional Roles	0	6	1.50	1.862
20.1 No Diversity, Q 20: Please rank a maximum of three types of diversities you consider as most important for the success of a management team:				
20.2 Age	1	3	1.80	.837
20.3 Cultural	1	3	1.86	1.069
20.4 Educational	1	3	1.95	.815
20.5 Functional	1	3	2.19	.710
20.6 Gender	1	3	2.00	1.000
20.7 Social	1	3	1.92	.909
20.8 Experience, Originally Others but based on input it is relabeled.	1	3	2.00	.894
21 What year was the company established?	2001	2010	2004.87	2.638
22 Please indicate the industry the company is operating in:	1	6	2.85	1.531
23 How many people work full-time for the company?	1	60	8.92	12.795
24 Is the company located within a university incubator (e.g. technology park, science park, etc.)?	0	1	.33	.478
25.1 Seed Capital, Q 25: Has the company received any of the following findings:	0	1	.56	.502
25.2 Venture Capital	0	1	.51	.506
26 How many patents does the company currently hold or has applied for?	0	70	4.50	11.646
27 Does the company cooperate with direct competitors as business partners (e.g. as suppliers, buyers, subcontractors)?	1	2	1.56	.502
28 In which year did the discovery of your technology (i.e., technological breakthrough) take place?	1985	2011	2002.49	5.566
29 When did the technological development (i.e., development of prototype) start?	1990	2011	2003.76	4.146
30 When did the company have its first sales or expect to sale?	2000	2020	2008.73	4.005

Correlation Matrix

Here follows cross correlation matrix for all important variables in the study. This was achieved through SPSS bivariate correlation analysis and covers both scale and nominal/ordinal variables with Pearson and Spearman rho techniques respectively.

Table 18 Correlation Matrix (Pearson & Spearman)

Construct/ variables	Correlations with	Pearson Correlation Sig. (1-tailed), N	Spearman rho Correlation – Sig. (1-tailed), N
Q1. FAC1_Team's Perceived Performance	Q4. FAC4_Team Atmosphere or Positive Affective Tone	0.510**, 0.00, 48	
	Q5. FAC5_Team Orientation or Entrepreneurial Orientation	0.394**, 0.003, 46	
	Q8. FAC8_Team's Interpersonal interaction	0.378**, 0.006, 43	
	Q9. FAC9_Team's Task-oriented interaction	0.458**, 0.001, 43	
	Q18 TMT cumulative number of years of industry exp.	-0.293*, 0.031, 41	
	Q 25.1 Company received - Seed Capital	0,257, 0.057, 39	
	Q26. Patents the company hold or has applied for	-0.232, 0.086, 36	
	Q17. All Educational degree holders - Sum_TMTEdu	-0.276*, 0.041, 41	-0.331*, 0.017, 41
	Q20.5 Perceived importance diversities - TMan_PerDiv3		-0.318*, 0.023, 40
Q2. FAC2_Team Decision Making Speed	Q3. FAC3_Team Polychronicity or Multitasking	0.279*, 0.027, 48	
	Q5. FAC5_Team Orientation or Entrepr. Orientation	0.254*, 0.044, 46	
	Q16. Number of TMT members	-0.182, 0.128, 41	
	Q23. People work full-time for the company	-0.285*, 0.039, 39	
	Q13. Gender of the leaders whole survey,TMan_GenDiv3		0,192, 0.096, 48
Q3. FAC3_Team Polychronicity or Multitasking	Q2. FAC2_Team Decision Making Speed	0.279*, 0.027, 48	
	Q5. FAC5_Team Orientation or Entrepr. Orientation	0.250*, 0.047, 46	
	Q7. FAC7b_Team's (Time Orientation and) Rhythm	-0.485**, 0.00, 46	

	Q.12 Age of the CEO		-0.298*, 0.029, 41
	Q18 TMT cumulative number of years of industry exp.		0.321*, 0.020, 41
	Q20.2 Perceived importance of Age diversity		-0.949**, 0.007, 5
	Q20.7 Perceived importance of Social diversity		-0.459*, 0.010, 25
	Q20.8 Perceived importance of Experience diversity		0.837*, 0.019, 6
	Q26. Patents the company hold or has applied for		0.322*, 0.028, 36
	Q17. All Educational degree holders - Sum_TMTEdu		0.245, ,0.061, 41
	Q19 Actual Functional diversity TMan_FuncDiv3		0.266*, 0.046, 41
4. FAC4_Team Atmosphere or Positive Affective Tone	Q1. FAC1_Team's Perceived Performance	0.510**, 0.00, 48	
	Q5. FAC5_Team Orientation or Entrepr. Orientation	0.556**, 0.00, 46	
	Q6. FAC6_Team's Strategic Decision Comprehensiveness	0.285*, 0.027, 46	
4. FAC4_Team Atmosphere or Positive Affective Tone	Q7. FAC7b_Team's (Time Orientation and) Rhythm	-0.360**, 0.007, 46	
	Q9. FAC9_Team's Task-oriented interaction	0.518**, 0.00, 43	
	Q13. Your Gender		-0.305*, 0.026, 41
	Q17. All Educational degree holders - Sum_TMTEdu		0.246, 0.061, 41
	Q 25.2 Company received - Venture Capital	0,246, 0.066, 39	
Q5. FAC5_Team Orientation or Entrepr. Orientation	Q1. FAC1_Team's Perceived Performance	0.394**, 0.003, 46	
	Q2. FAC2_Team Decision Making Speed	0.254*, 0.044, 46	
	Q3. FAC3_Team Polychronicity or Multitasking	0.250*, 0.047, 46	
	Q4. FAC4_Team Atmosphere or Positive Affective Tone	0.556**, 0,00, 46	
	Q6. FAC6_Team's Strategic Decision Comprehensiveness	0.350**, 0.009, 46	
	Q8. FAC8_Team's Interpersonal interaction	0.291*, 0.029, 43	
	Q9. FAC9_Team's Task-oriented interaction	0.622**, 0.00, 43	

	Q13. Your Gender	-0.330*, 0.018, 41	
	Q20.5 Perceived importance Of Functional diversity	-0.316*, 0.030, 36	
	Q19. Sum of all Functional Roles per comp- Sum_TMTFunc	0.280*, 0.038, 41	
Q6. FAC6_Team's Strategic Decision Comprehensiveness	Q1. FAC1_Team's Perceived Performance	0,216, 0.074, 46	
	Q4. FAC4_Team Atmosphere or Positive Affective Tone	0.285*, 0.027, 46	
	Q5. FAC5_Team Orientation or Entrepr. Orientation	0.350**, 0.009, 46	
	Q7. FAC7a_Team's Time Orientation and Rhythm - FAC7_TTimeRhythm summated	0.225, 0.067,46	
	Q9. FAC9_Team's Task-oriented interaction	0.304*, 0.024, 43	
	Q13. Your Gender	-0.329*, 0.018, 41	-0.258, 0.052, 41
	Q20.5 Perceived importance Of Functional diversity	-0.270, 0.056, 36	-0.228, 0.090, 36
Q7. FAC7b_Team's Time Orientation and Rhythm – selective factoring	Q1. FAC1_Team's Perceived Performance	-0.228, 0.063, 46	
	Q3. FAC3_Team Polychronicity or Multitasking	-.485**, 0,00, 46	
	Q4. FAC4_Team Atmosphere or Positive Affective Tone	-.360**, 0.007, 46	
	Q7. FAC7a_Team's Time Orientation and Rhythm - FAC7_TTimeRhythm summated	-0.277*, 0.031, 46	
	Q12. Your Age		-.377**, 0.008, 41
	Q18. TMT cumulative number of years of industry exp	-0.265*, 0.047, 41	-.274*,0.042, 41
	Q27. Cooperation with direct competitors as business partners e.g. as suppliers, buyers, subcont.)		-.273*, 0.046, 39
Q7. FAC7b_Team's Time Orientation and Rhythm – selective factoring	Q17. Actual Educational Diversity _Blau_EduDiv2	0,240, 0.065, 41	.273*, 0.042, 41
	Q19. Actual Functional Role Diversity TMan_FuncDiv3	-0.355*, 0.011, 41	-0.354*, 0.012, 41
	Q20.8 Perceived importance of Experience diversity		-0.800*, 0.028, 6
	Q23. People work full-time for the company	-.311*, 0.027, 39	-0.284*, 0.040, 39

	Q29-28_Year from Discovery to Development of technology_ Diff_TechDiscDev	0.299*, 0.036, 37	0.304*, 0.034, 37
	Q30-21_Years from Discovery to Sales of technology_ Diff_TechEstSales	0.262, 0.059, 37	0.264, 0.057, 37
	Q20.5 Perceived importance Of Functional diversity	-0.270, 0.056, 36	-0.228, 0.090, 36
Q8. FAC8_Team's Interpersonal interaction	Q1. FAC1_Team's Perceived Performance	0.378**, 0.006, 43	
	Q5. FAC5_Team Orientation or Entrepr. Orientation	0.291*, 0.029, 43	
	Q9. FAC9_Team's Task-oriented interaction	0.499**, 0.00, 43	
	Q13. Your Gender		0.225, 0.079, 41
	Q20.8 Perceived importance of Experience diversity	0.803*, 0.027, 6	0.837*, 0.019, 6
	Q24 Company located within a university incubator	-.364*, .011, 39	-.405**, 0.005, 39
	Q 25.2 Company received - Venture Capital		-.249, .063, 39
	Q19 Actual Functional diversity TMan_FuncDiv3	.353*, .012, 41	.323*, .020, 41
	Q29-28_Year from Discovery to Development of technology_ Diff_TechDiscDev	-,255, .064, 37	-.282*, .046, 37
	Q30-21_Years from Discovery to Sales of technology_ Diff_TechEstSales	-,269, .054, 37	-.307*, 0.032, 37
Q9. FAC9_Team's Task-oriented interaction	Q1. FAC1_Team's Perceived Performance	.458**, .001, 43	.455**, .001, 43
	Q4. FAC4_Team Atmosphere or Positive Affective Tone	.518**, 0.00, 43	.500**, 0.00, 43
	Q5. FAC5_Team Orientation or Entrepr. Orientation	.622**, 0.00, 43	.651**, 0.00, 43
	Q6. FAC6_Team's Strategic Decision Comprehensiveness	.304*, .024, 43	,208, .090, 43
	Q8. FAC8_Team's Interpersonal interaction	.499**, 0.00, 43	.452**, .001, 43
	Q12. Your Age	-.254, .054, 41	-.144, .185, 41
	Q16. Number of TMT members	-.216, .087, 41	-.149, .175, 41
	Q17. All Educational degree holders - Sum_TMTEdu	-.273*, .042, 41	-,256, .053, 41
Q.12 Your Age	Q3. FAC3_Team Polychronicity or Multitasking	-.313*, .023, 41	-.298*, .029, 41

	Q7. FAC7a_Team's Time Orientation and Rhythm - FAC7_TTimeRhythm summated	-.392**, .006, 41	-.377**, 008, 41
	Q9. FAC9_Team's Task-oriented interaction	-,254, .054, 41	-,144, .185, 41
	Q14. Years of experience as TMT member	.488**, .001, 41	0.519**, 0.00, 41
	Q15. CEO's ownership percentage in %?	.364*, .013, 37	0.291*, 0.04, 37
	Q16. Number of TMT members	-.244, .062, 41	-,212, .092, 41
	Q17 Actual Educational diversity - SD_EduDiv0	-.363*, .015, 36	-.370*, .013, 36
	Q17 Actual Educational diversity - COV_EduDiv1	-.289*, .044, 36	- 0.313*, 0.032, 36
	Q19 Actual Functional diversity TMan_FuncDiv3		-. 0286*, 0.035, 41
	Q20.2 Perceived importance Of Age diversity		0.806*, 0.050, 5
	Q20.5 Perceived importance Of Functional diversity		- 0.305*, 0.035, 36
	Q27 Cooperation with direct competitors as business partners e.g. as suppliers, buyers, subcont.)		0.294*, 0.035, 39
	Q29-28_Year from Discovery to Development of technology_ Diff_TechDiscDev	,258, .062, 37	,272, .052, 37
	Q30-Q28_Years from Development to Sales of technology_Diff_TechDevSales	,258, .062, 37	.290*, .041, 37
Q13. Your Gender	Q1. FAC1_Team's Perceived Performance	-.236, .069, 41	-,216, .088, 41
	Q4. FAC4_Team Atmosphere or Positive Affective Tone	-.329*, .018, 41	-.305*, .026, 41
	Q5. FAC5_Team Orientation or Entrepr. Orientation	-.282*, .037, 41	-.330*, .018, 41
	Q6. FAC6_Team's Strategic Decision Comprehensiveness	-.329*, .018, 41	-.258, .052, 41
	Q 25.2 Company received - Venture Capital	-0.273*, 0.046, 39	-0.273*, 0.046, 39
	Q21 Age of the company - Diff_CompAge	.294*, .035, 39	0.246, 0.065, 39
	Q29-28_Difference years - Discovery to Development of technology - Diff_TechDiscDev	-.432**, .004, 37	-0.372*, 0.012, 37

	Q28-30_Difference years - Discovery to Sales of technology - Diff_TechDiscSales	-.320*, .027, 37	-0.401**, 0.007, 37
Q14. Experience as TMT member	Q12. Your Age	.488**, .001, 41	.519**, .000, 41
	Q16. Number of TMT members	-0.402**, .005, 41	-0.420**, 0.003, 41
	Q17. All Educational degree holders - Sum_TMTEdu	-,232, .072, 41	-0.310*, 0.024, 41
	Q17 Actual Educational diversity - SD_EduDiv0	-.344*, .020, 36	-.280*, .049, 36
	Q19. Actual Functional Roles Diversity - Sum_FuncDic0	-.274*, .041, 41	-.274*, .041, 41
	Q19. Actual Functional Roles Diversity - SD_FuncDiv0	-.306*, .026, 41	
	Q20.8 Perceived importance of Experience diversity	.750*, .043, 6	0.750*, 0.043, 6
	Q21 Age of the company - Diff_CompAge	-,227, .082, 39	-,246, .065, 39
Q15. CEO's ownership percentage in %?	Q12. Your Age	.364*, .013, 37	.291*, .040, 37
	Q16. Number of TMT members	-.252, .066, 37	
	Q19 Actual Functional diversity - COV_FuncDiv1	.568**, .000, 37	
	Q19 Actual Functional diversity Blau_FuncDiv2	-.510**, .001, 37	
	Q20.7 Perceived importance of Social diversity	.369*, .050, 21	
	Q24 Company located within a university incubator		-0.284*, 0.047, 36
	Q 25.1 Company received - Seed Capital	-.321*, .028, 36	
Q16. Number of TMT members Q17. Sum of all TMT Educational degree holders Q19. Sum of all TMT Functional Roles	Q12. Your Age	-,244, .062, 41	-,212, .092, 41
	Q14. Years of experience as TMT member	-.402*, 0.005, 41 -,232, .072, 41 -.274*, .041, 41	-.420*, 0.003, 41 -.310*, .024, 41 -,221, .082, 41
	Q17 Actual Educational diversity - SD_EduDiv0	-,232, .072, 41	.578**, .000, 36
Q18 TMT cumulative number of years of industry experience	Q17 Actual Educational diversity - COV_EduDiv1	-.274*, .041, 41	

Table 19 A Correlation Matrix – showing Perason correlation among team process & diversity instruments

		TPPerf	SBI_all	SBI2-Q8.3	TPOrient	TPAPTone	TPTRyhtm	TPTRyhtm 2	TPDSpeed	TPDComhrens	TPPolychr	TDiv_SD_Edu	TDiv_CoV_Edu	TDiv_Blau_Edu	TDiv_Tman_Edu	TDiv_SD_Func	TDiv_CoV_Func	TDiv_Blau_Func	TDiv_Tman_Func
TPPerf	Pearson	1	.497**	.514**	.394**	.510**	,078	-,228	-,044	,216	,015	-,102	,073	-,202	-,225	-,110	-,126	,127	,183
	Sig. (2-		,001	,000	,007	,000	,617	,127	,768	,149	,918	,555	,672	,206	,158	,493	,432	,429	,252
	N	48	43	43	46	48	46	46	48	46	48	36	36	41	41	41	41	41	41
SBI_all	Pearson	.497**	1	.992**	.589**	.505**	,103	-,191	-,027	,221	,011	-,184	-,073	-,068	-,073	-,090	-,083	,221	,264
	Sig. (2-	,001		,000	,000	,001	,509	,220	,865	,155	,946	,284	,674	,675	,650	,578	,607	,165	,095
	N	43	43	43	43	43	43	43	43	43	43	36	36	41	41	41	41	41	41
SBI2-Q8.3	Pearson	.514**	.992**	1	.612**	.548**	,085	-,200	-,033	,258	,022	-,196	-,052	-,074	-,081	-,080	-,062	,201	,238
	Sig. (2-	,000	,000		,000	,000	,586	,198	,834	,095	,890	,251	,763	,645	,616	,621	,701	,207	,133
	N	43	43	43	43	43	43	43	43	43	43	36	36	41	41	41	41	41	41
TPOrient	Pearson	.394**	.589**	.612**	1	.556**	,227	-,148	,254	.350*	,250	,035	,089	-,155	-,167	-,004	,069	,142	,219
	Sig. (2-	,007	,000	,000		,000	,130	,333	,089	,017	,094	,841	,607	,335	,298	,980	,666	,377	,168
	N	46	43	43	46	46	46	46	46	46	46	36	36	41	41	41	41	41	41
TPAPTone	Pearson	.510**	.505**	.548**	.556**	1	-,157	-.360*	-,016	,285	,175	-,074	,026	-,059	-,073	,100	-,128	,163	,162
	Sig. (2-	,000	,001	,000	,000		,297	,014	,914	,055	,234	,670	,878	,713	,650	,534	,426	,308	,312
	N	48	43	43	46	48	46	46	48	46	48	36	36	41	41	41	41	41	41
TPTRyhtm	Pearson	,076	,103	,085	,227	-,157	1	-,277	,158	,225	,164	,388*	,344*	-,426**	-,392*	,232	,122	,214	,268
	Sig. (2-	,617	,509	,586	,130	,297		,062	,294	,134	,275	,019	,040	,006	,011	,144	,448	,180	,104
	N	46	43	43	46	46	46	46	46	46	46	36	36	41	41	41	41	41	41
TPTRyhtm 2	Pearson	-,228	-,191	-,200	-,148	-.360*	-,277	1	,164	-,093	-.485**	-,237	-,273	,240	,226	-,161	-,031	-.331*	-.355*
	Sig. (2-	,127	,220	,198	,333	,014	,062		,278	,537	,001	,164	,108	,131	,155	,316	,848	,035	,023
	N	46	43	43	46	46	46	46	46	46	46	36	36	41	41	41	41	41	41
TPDSpeed	Pearson	-,044	-,027	-,033	,254	-,016	,158	,164	1	-,181	,279	-,012	,140	-,238	-,227	-,109	,122	-,095	-,016
	Sig. (2-	,768	,865	,834	,089	,914	,294	,278		,227	,055	,945	,415	,134	,154	,497	,446	,554	,922
	N	48	43	43	46	48	46	46	48	46	48	36	36	41	41	41	41	41	41
TPDComhrens	Pearson	,216	,221	,258	.350*	,285	,225	-,093	-,181	1	,073	-,103	-,001	-,071	-,098	,014	,131	-,215	-,171
	Sig. (2-	,149	,155	,095	,017	,055	,134	,537	,227		,628	,550	,994	,658	,541	,932	,416	,176	,284
	N	46	43	43	46	46	46	46	46	46	46	36	36	41	41	41	41	41	41
TPPolychr	Pearson	,015	,011	,022	,250	,175	,164	-.485**	,279	,073	1	,258	,112	-,156	-,198	,132	,099	,169	,210
	Sig. (2-	,918	,946	,890	,094	,234	,275	,001	,055	,628		,128	,516	,329	,215	,410	,539	,290	,188
	N	48	43	43	46	48	46	46	48	46	48	36	36	41	41	41	41	41	41
TDiv_SD_Edu	Pearson	-,102	-,184	-,196	,035	-,074	,388*	-,237	-,012	-,103	,258	1	,630**	-,507**	-,456**	,615**	,070	,309	,323
	Sig. (2-	,555	,284	,251	,841	,670	,019	,164	,945	,550	,128		,000	,002	,005	,000	,685	,066	,055
	N	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
TDiv_CoV_Edu	Pearson	,073	-,073	-,052	,089	,026	,344*	-,273	,140	-,001	,112	,630**	1	-,855**	-,769**	,324	-,060	,361*	,379*
	Sig. (2-	,672	,674	,763	,607	,878	,040	,108	,416	,994	,516	,000		,000	,000	,054	,730	,030	,023
	N	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
TDiv_Blau_Edu	Pearson	-,202	-,068	-,074	-,155	-,059	-.426**	,240	-,238	-,071	-,156	-.507**	-.855**	1	.990**	,013	,225	-,219	-,220
	Sig. (2-	,206	,675	,645	,335	,713	,005	,131	,134	,658	,329	,002	,000		,000	,937	,156	,169	,167
	N	41	41	41	41	41	41	41	41	41	41	36	36	41	41	41	41	41	41
TDiv_Tman_Edu	Pearson	-,225	-,073	-,081	-,167	-,073	-.392*	,226	-,227	-,098	-,198	-.456**	-.769**	.990**	1	,035	,244	-,220	-,211
	Sig. (2-	,158	,650	,616	,298	,650	,011	,155	,154	,541	,215	,005	,000	,000		,830	,124	,167	,186
	N	41	41	41	41	41	41	41	41	41	41	36	36	41	41	41	41	41	41
TDiv_SD_Func	Pearson	-,110	-,090	-,080	-,004	,100	,232	-,161	-,109	,014	,132	,615**	,324	,013	,035	1	.402**	,123	,162
	Sig. (2-	,493	,578	,621	,980	,534	,144	,316	,497	,932	,410	,000	,054	,937	,830		,009	,443	,311
	N	41	41	41	41	41	41	41	41	41	41	36	36	41	41	41	41	41	41
TDiv_CoV_Func	Pearson	-,126	-,083	-,062	,069	-,128	,122	-,031	,122	,131	,099	,070	-,060	,225	,244	.402**	1	-.504**	-.314*
	Sig. (2-	,432	,607	,701	,666	,426	,448	,848	,446	,416	,539	,685	,730	,156	,124	,009		,001	,045
	N	41	41	41	41	41	41	41	41	41	41	36	36	41	41	41	41	41	41
TDiv_Blau_Func	Pearson	,127	,221	,201	,142	,163	,214	-.331*	-,095	-,215	,169	,309	.361*	-,219	-,220	,123	-.504**	1	.951**
	Sig. (2-	,429	,165	,207	,377	,308	,180	,035	,554	,176	,290	,066	,030	,169	,167	,443	,001		,000
	N	41	41	41	41	41	41	41	41	41	41	36	36	41	41	41	41	41	41
TDiv_Tman_Func	Pearson	,183	,264	,238	,219	,162	,268	-.366*	-,016	-,171	,210	,323	.379*	-,220	-,211	,162	-.314*	.951**	1
	Sig. (2-	,252	,095	,133	,168	,312	,104	,023	,922	,284	,188	,055	,023	,167	,186	,311	,045	,000	
	N	41	41	41	41	41	41	41	41	41	41	36	36	41	41	41	41	41	41

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Notes on Regression

The minimum ratio of valid cases to independent variables for multiple regression is 5 to 1. With 90 valid cases and 5 independent variables, the ratio for this analysis is 18.0 to 1, which satisfies the minimum requirement.

To avoid repeating evaluating criteria's of the regression results as presented in the Appendix, here follows what is important to look at in regression tables.

"Variables Entered/Removed" table tells us about the predictor variables and the method used. The **"Enter"** method suggests all variables entered simultaneously in the model. For relatively low numbers of cases it is safe to use Enter. For large number of cases a minor variations in the data due to sampling errors can have a large effect on the order in which variables are entered and therefore the likelihood of them being retained. Through **"Forward"** method SPSS enters the variables into the model one at a time in an order determined by the strength of their correlation with the criterion variable. **Stepwise** is the most sophisticated method where each variable is entered in sequence and its value assessed. If adding the variable contributes to the model then it is retained, but all other variables in the model are then re-tested to see if they are still contributing to the success of the model. If they no longer contribute significantly they are removed. Thus, this method should ensure that you end up with the smallest possible set of predictor variables included in your model.

The **"Model Summary"** table is important. The R values Adjusted R Square value tells us that our model accounts for how much % of variance. F Change

The **"Coefficients"** table is also essential to look in to as it have Standardized Beta Coefficients that give a measure of the contribution of each variable to the model. A large value indicates that a unit change in this predictor variable has a large effect on the criterion variable. The **t and Sig (p)** values give a rough indication of the impact of each predictor variable – a big absolute t value and small p value suggests that a predictor variable is having a large impact on the criterion variable.

Collinearity diagnostics these can also be available in this table. The **tolerance** values are a measure of the correlation between the predictor variables and can vary between 0 and 1. The closer to zero the tolerance value is for a variable, the stronger the relationship between this and the other predictor variables. Low tolerance value close to 0 will be troublesome and those close to 1 will be good. SPSS will not include a predictor variable in a model if it has a

tolerance of less that 0.0001. However, one can set ones own criteria rather higher for example excluding any variable that has a tolerance level of less than 0.01. **VIF** is an alternative measure of collinearity (in fact it is the reciprocal of tolerance) in which a large value indicates a strong relationship between predictor variables.

How well does a model explain the variation in the dependent variable?
Effectiveness (R2 and R2adj)

0 - 25%	very poor and likely to be unacceptable
25 - 50%	poor, but may be acceptable
50 - 75%	good
75 - 90%	very good
90% +	likely that there is something wrong with your analysis

What relationship does each individual regressor have with the dependent variable?
In SPSS output table entitled Coefficients column headed **Unstandardised coefficients - B** or **Standardised coefficients – beta** gives regression coefficient for each regressor variable (IV). "With all the other variables held constant" and its units of coefficient are same as those for regressor (IV)
In terms of **reporting the model** one should describe the characteristics of the model before you describe the significance of the relationship. the significance of the model by citing the F and the associated p value, along with the R square and adjusted R square, which indicates the strength of the model, for example:

- $\mathbf{R^2}$, $\mathbf{R^2_{adj}}$ - *how well does the model fit the data?*
- $\mathbf{F_{m,n}}$ - *is the relationship significant?*
  F (degree of freedom (df) of the regression, df of the residual)
- **p** < 0.05 or p < .005 or p < .001- significance of the
- **Regression equation** - *how to calculate values of DV from known values of IVs?*
- **Describe results in plain English**

R square = 0.91 Adjusted R square = .833; F (3, 43) = 77.7, p < 0.0005 (stepwise method).
Significant variables are shown below in term of DV Z.

IV or Predictor Variable	Beta	p
Variable A	.750	<0.0005
Variable B	.342	<0.0005

(Variable C was not a significant predictor in this model.)

Table 20 Regression Tables for Testing Propositions

Proposition 1: SBI as Performance measure

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Factor_Q5.1 - 5.5 Team Orientation or Entrepreneurial orientation	.	Enter

a. All requested variables entered.

b. Dependent Variable: REGR factor Q8 & Q9_Sociobehavioral Integration_all except Q8.3

Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.514[a]	.264	.244	.86924064	.264	13.293	1	37	.001
2	.514[b]	.264	.224	.88116568	.000	.005	1	36	.942

a. Predictors: (Constant), REGR factor Q8 & Q9_Sociobehavioral Integration_all except Q8.3

b. Predictors: (Constant), REGR factor Q8 & Q9_Sociobehavioral Integration_all except Q8.3, 23 How many people work full-time for the company?

c. Dependent Variable: Factor_Q1.1 - 1.3 Team's Perceieved Performance

ANOVA[c]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.044	1	10.044	13.293	.001[a]
	Residual	27.956	37	.756		
	Total	38.000	38			
2	Regression	10.048	2	5.024	6.470	.004[b]
	Residual	27.952	36	.776		
	Total	38.000	38			

a. Predictors: (Constant), REGR factor Q8 & Q9_Sociobehavioral Integration_all except Q8.3

b. Predictors: (Constant), REGR factor Q8 & Q9_Sociobehavioral Integration_all except Q8.3, 23 How many people work full-time for the company?

c. Dependent Variable: Factor_Q1.1 - 1.3 Team's Perceieved Performance

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
	B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF

							order				
1	(Constant)	1.788E-16	.139		.000	1.000					
	REGR factor Q8 & Q9_Sociobehavioral Integration_all except Q8.3	.514	.141	.514	3.646	.001	.514	.514	.514	1.000	1.000
2	(Constant)	.007	.173		.042	.967					
	REGR factor Q8 & Q9_Sociobehavioral Integration_all except Q8.3	.514	.143	.514	3.592	.001	.514	.514	.514	.999	1.001
	23 How many people work full-time for the company?	-.001	.011	-.010	-.073	.942	-.027	-.012	-.010	.999	1.001

a. Dependent Variable: Factor_Q1.1 - 1.3 Team's Perceieved Performance

Proposition 2: EO as a Performance measure

a- Between EO and Performance

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Factor_Q5.1 - 5.5 Team Orientation or Entrepreneurial orientation	.	Enter

a. All requested variables entered.

b. Dependent Variable: REGR factor Q8 & Q9_Sociobehavioral Integration_all except Q8.3

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.612[a]	.375	.360	.80005305	.375	24.616	1	41	.000

a. Predictors: (Constant), Factor_Q5.1 - 5.5 Team Orientation or Entrepreneurial orientation

b. Dependent Variable: REGR factor Q8 & Q9_Sociobehavioral Integration_all except Q8.3

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	15.757	1	15.757	24.616	.000[a]
	Residual	26.243	41	.640		
	Total	42.000	42			

a. Predictors: (Constant), Factor_Q5.1 - 5.5 Team Orientation or Entrepreneurial orientation

b. Dependent Variable: REGR factor Q8 & Q9_Sociobehavioral Integration_all except Q8.3

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	3.698E-17	.122		.000	1.000					
	Factor_Q5.1 - 5.5 Team Orientation or Entrepreneurial orientation	.612	.123	.612	4.961	.000	.612	.612	.612	1.000	1.000

a. Dependent Variable: REGR factor Q8 & Q9_Sociobehavioral Integration_all except Q8.3

a. Between EO, SBI and Performance

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Factor_Q5.1 - 5.5 Team Orientation or Entrepreneurial orientation	.	Enter
2	REGR factor Q8 & Q9_Sociobehavioral Integration_all except Q8.3	.	Enter

a. All requested variables entered.

b. Dependent Variable: Factor_Q1.1 - 1.3 Team's Perceieved Performance

Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.394[a]	.155	.135	.93020338	.155	7.539	1	41	.009

2	.524[b]	.274	.238	.87288826	.119	6.561	1	40	.014

a. Predictors: (Constant), Factor_Q5.1 - 5.5 Team Orientation or Entrepreneurial orientation

b. Predictors: (Constant), Factor_Q5.1 - 5.5 Team Orientation or Entrepreneurial orientation, REGR factor Q8 & Q9_Sociobehavioral Integration_all except Q8.3

c. Dependent Variable: Factor_Q1.1 - 1.3 Team's Perceieved Performance

ANOVA[c]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.524	1	6.524	7.539	.009[a]
	Residual	35.476	41	.865		
	Total	42.000	42			
2	Regression	11.523	2	5.761	7.561	.002[b]
	Residual	30.477	40	.762		
	Total	42.000	42			

a. Predictors: (Constant), Factor_Q5.1 - 5.5 Team Orientation or Entrepreneurial orientation

b. Predictors: (Constant), Factor_Q5.1 - 5.5 Team Orientation or Entrepreneurial orientation, REGR factor Q8 & Q9_Sociobehavioral Integration_all except Q8.3

c. Dependent Variable: Factor_Q1.1 - 1.3 Team's Perceieved Performance

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	2.039E-16	.142		.000	1.000					
	Factor_Q5.1 - 5.5 Team Orientation or Entrepreneurial orientation	.394	.144	.394	2.746	.009	.394	.394	.394	1.000	1.000
2	(Constant)	1.878E-16	.133		.000	1.000					
	Factor_Q5.1 - 5.5 Team Orientation or Entrepreneurial orientation	.127	.170	.127	.744	.461	.394	.117	.100	.625	1.600
	REGR factor Q8 & Q9_Sociobehavioral Integration_all except Q8.3	.436	.170	.436	2.561	.014	.514	.375	.345	.625	1.600

a. Dependent Variable: Factor_Q1.1 - 1.3 Team's Perceieved Performance

b. SBI and EO

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Factor_Q5.1 - 5.5 Team Orientation or Entrepreneurial orientation	.	Enter

a. All requested variables entered.

b. Dependent Variable: REGR factor Q8 & Q9_Sociobehavioral Integration_all except Q8.3

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	df1
1	.612[a]	.375	.360	.80005305	.375	24.616	1

a. Predictors: (Constant), Factor_Q5.1 - 5.5 Team Orientation or Entrepreneurial orientation

b. Dependent Variable: REGR factor Q8 & Q9_Sociobehavioral Integration_all except Q8.3

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	15.757	1	15.757	24.616	.000[a]
	Residual	26.243	41	.640		
	Total	42.000	42			

a. Predictors: (Constant), Factor_Q5.1 - 5.5 Team Orientation or Entrepreneurial orientation

b. Dependent Variable: REGR factor Q8 & Q9_Sociobehavioral Integration_all except Q8.3

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	3.698E-17	.122		.000	1.000					
	Factor_Q5.1 - 5.5 Team Orientation or Entrepreneurial orientation	.612	.123	.612	4.961	.000	.612	.612	.612	1.000	1.000

a. Dependent Variable: REGR factor Q8 & Q9_Sociobehavioral Integration_all except Q8.3

Proposition 3: Decision Making, Polychronicity and EO

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Factor_Q6.1 - 6.5 Team's Strategic Decision Comprehensiveness	.	Enter
2	Factor_Q2.1 - 2.2 Team Decision Making Speed	.	Enter
3	Factor_Q3.1 - 3.5 Team Polichronicity or Multitasking	.	Enter

a. All requested variables entered.

b. Dependent Variable: Factor_Q5.1 - 5.5 Team Orientation or Entrepreneurial orientation

Model Summary[d]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.350[a]	.122	.103	.94736170	.122	6.140	1	44	.017
2	.476[b]	.227	.191	.89970259	.104	5.785	1	43	.021
3	.495[c]	.245	.191	.89962953	.018	1.007	1	42	.321

a. Predictors: (Constant), Factor_Q6.1 - 6.5 Team's Strategic Decision Comprehensiveness

b. Predictors: (Constant), Factor_Q6.1 - 6.5 Team's Strategic Decision Comprehensiveness, Factor_Q2.1 - 2.2 Team Decision Making Speed

c. Predictors: (Constant), Factor_Q6.1 - 6.5 Team's Strategic Decision Comprehensiveness, Factor_Q2.1 - 2.2 Team Decision Making Speed, Factor_Q3.1 - 3.5 Team Polichronicity or Multitasking

d. Dependent Variable: Factor_Q5.1 - 5.5 Team Orientation or Entrepreneurial orientation

ANOVA[d]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.510	1	5.510	6.140	.017[a]
	Residual	39.490	44	.897		
	Total	45.000	45			
2	Regression	10.193	2	5.097	6.296	.004[b]
	Residual	34.807	43	.809		
	Total	45.000	45			
3	Regression	11.008	3	3.669	4.534	.008[c]
	Residual	33.992	42	.809		

	Total	45.000	45			

a. Predictors: (Constant), Factor_Q6.1 - 6.5 Team's Strategic Decision Comprehensiveness

b. Predictors: (Constant), Factor_Q6.1 - 6.5 Team's Strategic Decision Comprehensiveness, Factor_Q2.1 - 2.2 Team Decision Making Speed

c. Predictors: (Constant), Factor_Q6.1 - 6.5 Team's Strategic Decision Comprehensiveness, Factor_Q2.1 - 2.2 Team Decision Making Speed, Factor_Q3.1 - 3.5 Team Polichronicity or Multitasking

d. Dependent Variable: Factor_Q5.1 - 5.5 Team Orientation or Entrepreneurial orientation

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	-1.095E-16	.140		.000	1.000					
	Factor_Q6.1 - 6.5 Team's Strategic Decision Comprehensiveness	.350	.141	.350	2.478	.017	.350	.350	.350	1.000	1.000
2	(Constant)	-1.636E-16	.133		.000	1.000					
	Factor_Q6.1 - 6.5 Team's Strategic Decision Comprehensiveness	.409	.136	.409	3.002	.004	.350	.416	.403	.967	1.034
	Factor_Q2.1 - 2.2 Team Decision Making Speed	.328	.136	.328	2.405	.021	.254	.344	.323	.967	1.034
3	(Constant)	-1.432E-16	.133		.000	1.000					
	Factor_Q6.1 - 6.5 Team's Strategic Decision Comprehensiveness	.391	.138	.391	2.845	.007	.350	.402	.381	.950	1.052
	Factor_Q2.1 - 2.2 Team Decision Making Speed	.285	.143	.285	1.997	.052	.254	.294	.268	.881	1.135
	Factor_Q3.1 - 3.5	.141	.141	.141	1.003	.321	.250	.153	.135	.906	1.104

	Team Polichronicity or Multitasking										

a. Dependent Variable: Factor_Q5.1 - 5.5 Team Orientation or Entrepreneurial orientation

Proposition 4: Age, Gender, Educational & Functional and Entr. Orientation (EO)

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Q13_Dummy variable_Gender of the Leader	.	Enter
2	12 What is your age?	.	Enter
3	Blau Index_Q17_Educational Diversity per company	.	Enter
4	Blau Index_Q19_Functional Role Diversity per company	.	Enter

a. All requested variables entered.

b. Dependent Variable: Factor_Q5.1 - 5.5 Team Orientation or Entrepreneurial orientation

Model Summary[e]

					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.282[a]	.079	.056	.97171326	.079	3.363	1	39	.074
2	.339[b]	.115	.069	.96509940	.036	1.536	1	38	.223
3	.363[c]	.131	.061	.96900607	.016	.694	1	37	.410
4	.364[d]	.132	.036	.98182577	.001	.040	1	36	.842

a. Predictors: (Constant), Q13_Dummy variable_Gender of the Leader

b. Predictors: (Constant), Q13_Dummy variable_Gender of the Leader, 12 What is your age?

c. Predictors: (Constant), Q13_Dummy variable_Gender of the Leader, 12 What is your age?, Blau Index_Q17_Educational Diversity per company

d. Predictors: (Constant), Q13_Dummy variable_Gender of the Leader, 12 What is your age?, Blau Index_Q17_Educational Diversity per company, Blau Index_Q19_Functional Role Diversity per company

e. Dependent Variable: Factor_Q5.1 - 5.5 Team Orientation or Entrepreneurial orientation

ANOVA[e]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.175	1	3.175	3.363	.074[a]
	Residual	36.825	39	.944		
	Total	40.000	40			
2	Regression	4.606	2	2.303	2.473	.098[b]
	Residual	35.394	38	.931		
	Total	40.000	40			
3	Regression	5.258	3	1.753	1.867	.152[c]

	Residual	34.742	37	.939		
	Total	40.000	40			
4	Regression	5.297	4	1.324	1.374	.262[d]
	Residual	34.703	36	.964		
	Total	40.000	40			

a. Predictors: (Constant), Q13_Dummy variable_Gender of the Leader

b. Predictors: (Constant), Q13_Dummy variable_Gender of the Leader, 12 What is your age?

c. Predictors: (Constant), Q13_Dummy variable_Gender of the Leader, 12 What is your age?, Blau Index_Q17_Educational Diversity per company

d. Predictors: (Constant), Q13_Dummy variable_Gender of the Leader, 12 What is your age?, Blau Index_Q17_Educational Diversity per company, Blau Index_Q19_Functional Role Diversity per company

e. Dependent Variable: Factor_Q5.1 - 5.5 Team Orientation or Entrepreneurial orientation

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	.672	.397		1.694	.098					
	Q13_Dummy variable_Gender of the Leader	-.787	.429	-.282	-1.834	.074	-.282	-.282	-.282	1.000	1.000
2	(Constant)	1.422	.722		1.970	.056					
	Q13_Dummy variable_Gender of the Leader	-.803	.427	-.287	-1.883	.067	-.282	-.292	-.287	.999	1.001
	12 What is your age?	-.187	.151	-.189	-1.240	.223	-.180	-.197	-.189	.999	1.001
3	(Constant)	1.593	.753		2.115	.041					
	Q13_Dummy variable_Gender of the Leader	-.797	.428	-.285	-1.861	.071	-.282	-.293	-.285	.999	1.001
	12 What is your age?	-.171	.153	-.173	-1.116	.271	-.180	-.181	-.171	.982	1.018
	Blau	-.602	.723	-.129	-.833	.41	-.155	-.136	-	.983	1.01

	Index_Q17_Educationa l Diversity per company					0			.128		7
4	(Constant)	1.375	1.328		1.035	.307					
	Q13_Dummy variable_Gender of the Leader	-.789	.436	-.282	-1.808	.079	-.282	-.289	-.281	.989	1.011
	12 What is your age?	-.160	.165	-.161	-.968	.340	-.180	-.159	-.150	.869	1.151
	Blau Index_Q17_Educationa l Diversity per company	-.575	.745	-.123	-.771	.446	-.155	-.127	-.120	.949	1.054
	Blau Index_Q19_Functional Role Diversity per company	.217	1.083	.034	.200	.842	.142	.033	.031	.836	1.196

a. Dependent Variable: Factor_Q5.1 - 5.5 Team Orientation or Entrepreneurial orientation

Proposition 5: Age, Gender Diversities and Decision Making Comrehensiveness

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Q13_Dummy variable_Gender of the Leader	.	Enter
2	12 What is your age?	.	Enter

a. All requested variables entered.

b. Dependent Variable: Factor_Q6.1 - 6.5 Team's Strategic Decision Comprehensiveness

Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.329[a]	.108	.086	.95625622	.108	4.743	1	39	.036
2	.330[b]	.109	.062	.96864090	.000	.009	1	38	.925

a. Predictors: (Constant), Q13_Dummy variable_Gender of the Leader

b. Predictors: (Constant), Q13_Dummy variable_Gender of the Leader, 12 What is your age?

c. Dependent Variable: Factor_Q6.1 - 6.5 Team's Strategic Decision Comprehensiveness

ANOVA[c]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.337	1	4.337	4.743	.036[a]
	Residual	35.663	39	.914		
	Total	40.000	40			
2	Regression	4.346	2	2.173	2.316	.112[b]
	Residual	35.654	38	.938		
	Total	40.000	40			

a. Predictors: (Constant), Q13_Dummy variable_Gender of the Leader

b. Predictors: (Constant), Q13_Dummy variable_Gender of the Leader, 12 What is your age?

c. Dependent Variable: Factor_Q6.1 - 6.5 Team's Strategic Decision Comprehensiveness

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	.786	.390		2.012	.051					
	Q13_Dummy variable_Gender of the Leader	-.920	.423	-.329	-2.178	.036	-.329	-.329	-.329	1.000	1.000
2	(Constant)	.843	.724		1.164	.252					
	Q13_Dummy variable_Gender of the Leader	-.921	.428	-.330	-2.152	.038	-.329	-.330	-.330	.999	1.001
	12 What is your age?	-.014	.152	-.015	-.095	.925	-.005	-.015	-.015	.999	1.001

a. Dependent Variable: Factor_Q6.1 - 6.5 Team's Strategic Decision Comprehensiveness

P1 Supported: Socio-behavioral Integration (SBI) will contribute significantly positive to the Team Performance, thus will be used as Performance measure.

P2 Supported: Entrepreneurial Orientation (EO) will contribute significantly positive to the Team Performance, thus will be used as Performance measure.

P3a Supported: Faster Decision Making Speed (DS) will result stronger Entrepreneurial Orientation (EO) and consequesntly better Team Performance.

P3b Supported such that better Decision Making Comprehensiveness (DC) will result in stronger Entrepreneurial Orientation (EO) and conseq. better Team Performance.

H3c Rejected such that Polychronicity (PC) Multitasking will not contribute significantly to Entrepreneurial Orientation (EO), SBI nor to the Team Performance.

P4a Rejected such that there not enough evidence that Age has negative and Gender has positive influence on Entrepreneurial Orientation (EO).
P4b Rejected such that there is not enough evidence that “variety” type of Educational and Functional diversities have positively associated with Entrepreneurial Orientation (EO).

P5a Supported such that there evidence that Gender (male) diversity has negative correlation with Decision Making Comphrensiveness (DC).
P5b Rejected such that there not enough evidence that Age diversity has positive influence Decision Making Comphrensiveness (DC).

SEM Analysis

On the recommendations of SEM practitioners and scholars following cutoff criteria of fit indices are:

• A non-significant chi-square
• The chi-square divided on the degrees of freedom: <3 or <5
• Root Mean Square Error of Approximation (RMSA) ≤ 0.06
• Comparative Fit Index (CFI) >0.90 or 0.95
• Standardized Root Mean square Residual (SRMR) ≤ 0.08
For sample sizes N < 250, a SRMR value < 0.09 in combination with a CFI value => 0.95

A combination of two fit indices is recommended by using the Standardized Root Mean square Residual (SRMR) in combination with the Root Mean Square Error of Approximation (RMSA), the Tucker-Lewis Index (TLI) or the Comparative Fit Index (CFI). So a combination of RMSA, CFI and SRMR, together with chi-square, since chi-square is the only statistical test of significance for the testing the theoretical model.
For our sample size n = 48 and for certain models N = 34, would look like below than what is recommended for SEM, still it totally depends upon the model and number of variables used. In this research the use of SEM is for exploratory and demonstrative purposes rather than for propositions testing etc. Therefore, if a model does not fulfill sufficiently to the criteria set by these indices that means one need to improve the model through various techniques suggested by SEM literature.

Here follows the results of the first model depicted by figure 23?

Analysis Summary
…..

Groups

Group number 1 (Group number 1)

Notes for Group (Group number 1)
The model is recursive.
Sample size = 38

Variable Summary (Group number 1)

Your model contains the following variables (Group number 1)
Observed, endogenous variables

FAC2_SBI_6q
FAC5_TOrientation
FAC1_TPerformance
Observed, exogenous variables
FAC6_TSDComprehen
Gender
FAC2_TDSpeed
Unobserved, exogenous variables
e6
e7
e2

Variable counts (Group number 1)

Number of variables in your model: 9
Number of observed variables: 6
Number of unobserved variables: 3
Number of exogenous variables: 6
Number of endogenous variables: 3

Parameter Summary (Group number 1)

	Weights	Covariances	Variances	Means	Intercepts	Total
Fixed	3	0	0	0	0	3
Labeled	0	0	0	0	0	0
Unlabeled	5	1	6	3	3	18
Total	8	1	6	3	3	21

Models

Default model (Default model)

Notes for Model (Default model)

Computation of degrees of freedom (Default model)

Number of distinct sample moments: 27
Number of distinct parameters to be estimated: 18
Degrees of freedom (27 - 18): 9

Result (Default model)

Minimum was achieved
Chi-square = 7,562
Degrees of freedom = 9
Probability level = ,579

Regression Weights: (Group number 1 - Default model)

			Estimate	S.E.	C.R.	P	Label
FAC5_TOrientation	<---	FAC6_TSDComprehen	,292	,127	2,303	,021	
FAC5_TOrientation	<---	FAC2_TDSpeed	,203	,121	1,680	,093	
FAC2_SBI_6q	<---	FAC5_TOrientation	,570	,158	3,604	***	
FAC1_TPerformance	<---	FAC2_SBI_6q	,410	,161	2,541	,011	
FAC1_TPerformance	<---	FAC5_TOrientation	-,076	,180	-,421	,674	

Standardized Regression Weights: (Group number 1 - Default model)

			Estimate
FAC5_TOrientation	<---	FAC6_TSDComprehen	,343
FAC5_TOrientation	<---	FAC2_TDSpeed	,250
FAC2_SBI_6q	<---	FAC5_TOrientation	,510
FAC1_TPerformance	<---	FAC2_SBI_6q	,443
FAC1_TPerformance	<---	FAC5_TOrientation	-,073

Means: (Group number 1 - Default model)

	Estimate	S.E.	C.R.	P	Label
FAC2_TDSpeed	-,116	,170	-,679	,497	
FAC6_TSDComprehen	-,011	,163	-,067	,947	
Gender	,868	,056	15,627	***	

Intercepts: (Group number 1 - Default model)

	Estimate	S.E.	C.R.	P	Label
FAC5_TOrientation	-,085	,126	-,671	,502	
FAC2_SBI_6q	-,004	,134	-,030	,976	
FAC1_TPerformance	-,012	,132	-,089	,929	

Covariances: (Group number 1 - Default model)

			Estimate	S.E.	C.R.	P	Label
Gender	<-->	FAC6_TSDComprehen	-,118	,058	-2,021	,043	

Correlations: (Group number 1 - Default model)

			Estimate
Gender	<-->	FAC6_TSDComprehen	-,352

Variances: (Group number 1 - Default model)

	Estimate	S.E.	C.R.	P	Label
FAC6_TSDComprehen	,977	,227	4,301	***	
FAC2_TDSpeed	1,075	,250	4,301	***	
e2	,580	,135	4,301	***	
e6	,656	,153	4,301	***	
e7	,631	,147	4,301	***	
Gender	,114	,027	4,301	***	

Squared Multiple Correlations: (Group number 1 - Default model)

	Estimate
FAC5_TOrientation	,180
FAC2_SBI_6q	,260
FAC1_TPerformance	,168

Regression Weights: (Group number 1 - Default model)

Parameter	SE	SE-SE	Mean	Bias	SE-Bias

Parameter			SE	SE-SE	Mean	Bias	SE-Bias
FAC5_TOrientation	<---	FAC6_TSDComprehen	,141	,003	,284	-,008	,004
FAC5_TOrientation	<---	FAC2_TDSpeed	,144	,003	,196	-,007	,005
FAC2_SBI_6q	<---	FAC5_TOrientation	,143	,003	,569	-,001	,005
FAC1_TPerformance	<---	FAC2_SBI_6q	,147	,003	,431	,021	,005
FAC1_TPerformance	<---	FAC5_TOrientation	,209	,005	-,079	-,003	,007

Standardized Regression Weights: (Group number 1 - Default model)

Parameter			SE	SE-SE	Mean	Bias	SE-Bias
FAC5_TOrientation	<---	FAC6_TSDComprehen	,152	,003	,327	-,016	,005
FAC5_TOrientation	<---	FAC2_TDSpeed	,170	,004	,238	-,012	,005
FAC2_SBI_6q	<---	FAC5_TOrientation	,105	,002	,516	,006	,003
FAC1_TPerformance	<---	FAC2_SBI_6q	,130	,003	,448	,006	,004
FAC1_TPerformance	<---	FAC5_TOrientation	,200	,004	-,085	-,012	,006

Means: (Group number 1 - Default model)

Parameter	SE	SE-SE	Mean	Bias	SE-Bias
FAC2_TDSpeed	,165	,004	-,111	,005	,005
FAC6_TSDComprehen	,161	,004	-,013	-,002	,005
Gender	,057	,001	,869	,001	,002

Intercepts: (Group number 1 - Default model)

Parameter	SE	SE-SE	Mean	Bias	SE-Bias
FAC5_TOrientation	,126	,003	-,090	-,006	,004
FAC2_SBI_6q	,128	,003	-,004	,000	,004
FAC1_TPerformance	,130	,003	-,012	-,001	,004

Covariances: (Group number 1 - Default model)

Parameter			SE	SE-SE	Mean	Bias	SE-Bias
Gender	<-->	FAC6_TSDComprehen	,072	,002	-,111	,006	,002

Correlations: (Group number 1 - Default model)

Parameter			SE	SE-SE	Mean	Bias	SE-Bias
Gender	<-->	FAC6_TSDComprehen	,180	,004	-,332	,020	,006

Variances: (Group number 1 - Default model)

Parameter	SE	SE-SE	Mean	Bias	SE-Bias
FAC6_TSDComprehen	,238	,005	,945	-,032	,008
FAC2_TDSpeed	,131	,003	1,057	-,018	,004
e2	,117	,003	,533	-,047	,004
e6	,220	,005	,613	-,043	,007
e7	,141	,003	,587	-,044	,004
Gender	,040	,001	,110	-,004	,001

Squared Multiple Correlations: (Group number 1 - Default model)

Parameter	SE	SE-SE	Mean	Bias	SE-Bias
FAC5_TOrientation	,129	,003	,215	,035	,004
FAC2_SBI_6q	,106	,002	,277	,017	,003
FAC1_TPerformance	,096	,002	,211	,043	,003

Model Fit Summary

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	18	7,562	9	,579	,840
Saturated model	27	,000	0		
Independence model	12	35,686	15	,002	2,379

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	,788	,647	1,054	1,116	1,000
Saturated model	1,000		1,000		1,000
Independence model	,000	,000	,000	,000	,000

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	,000	,000	,163	,646
Independence model	,193	,112	,276	,005